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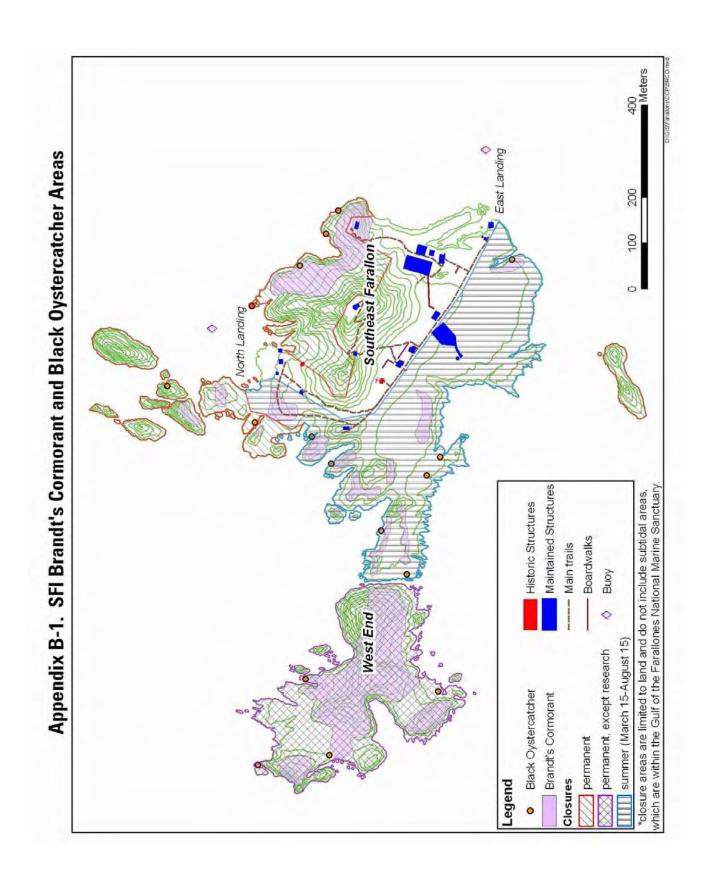
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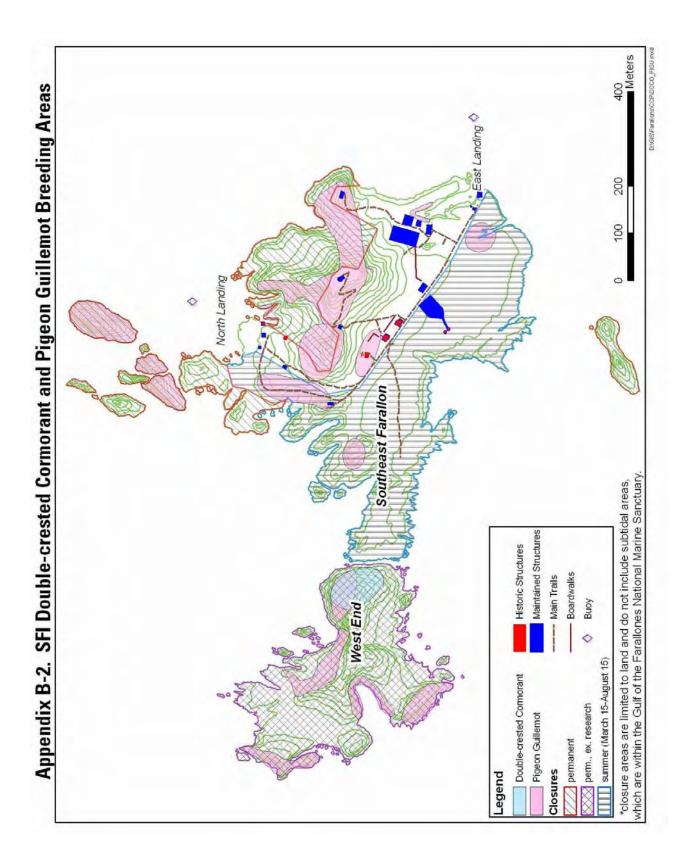
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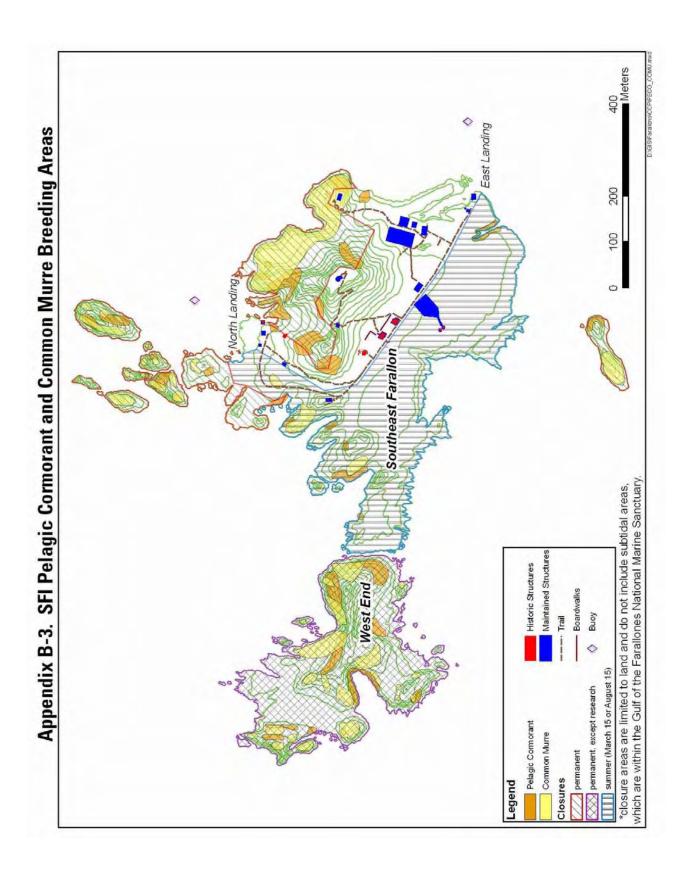
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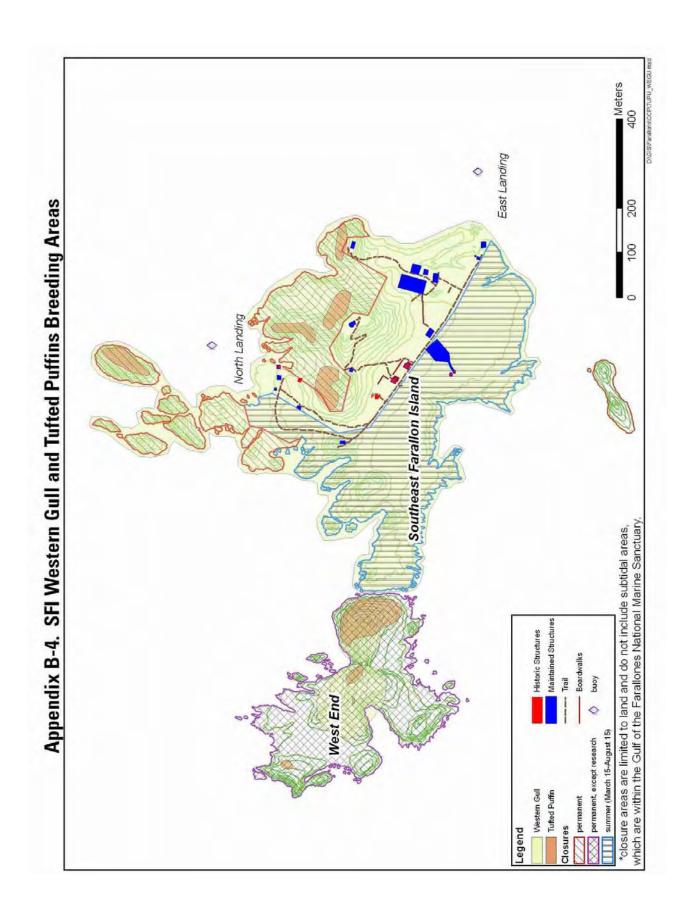
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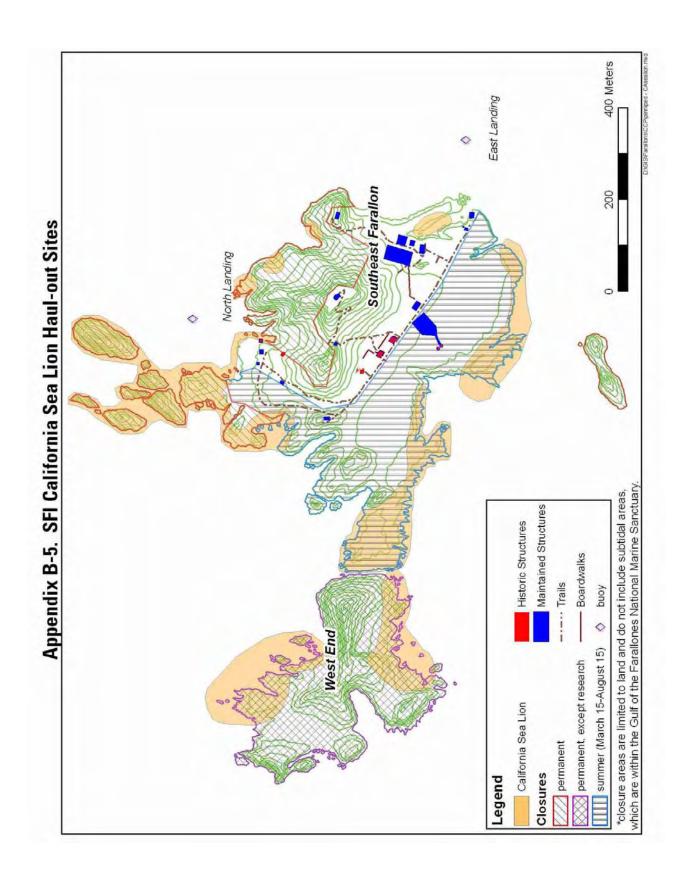
# Appendix B. Maps of Wildlife Sites

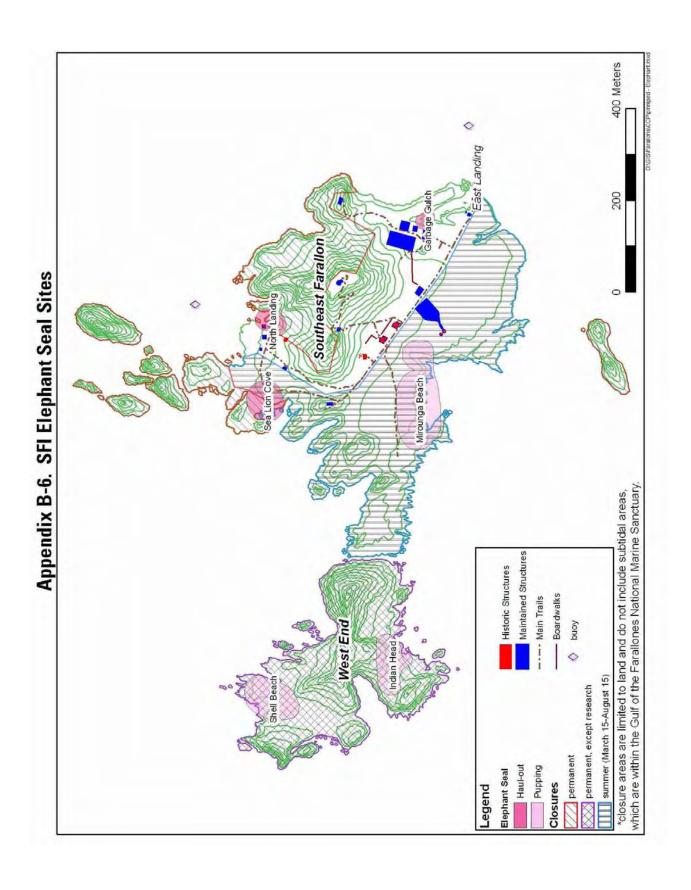


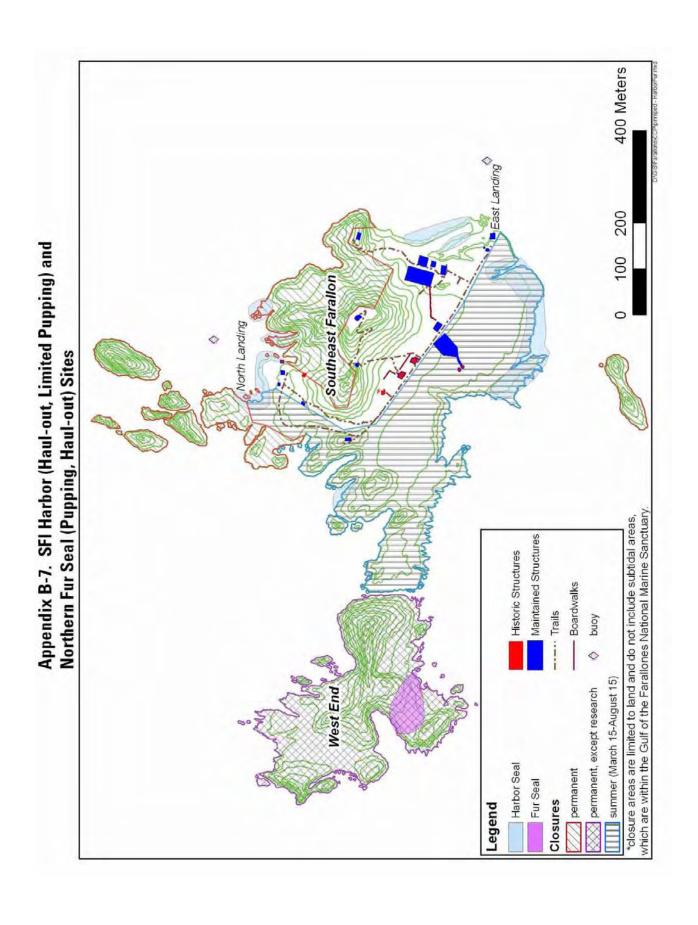


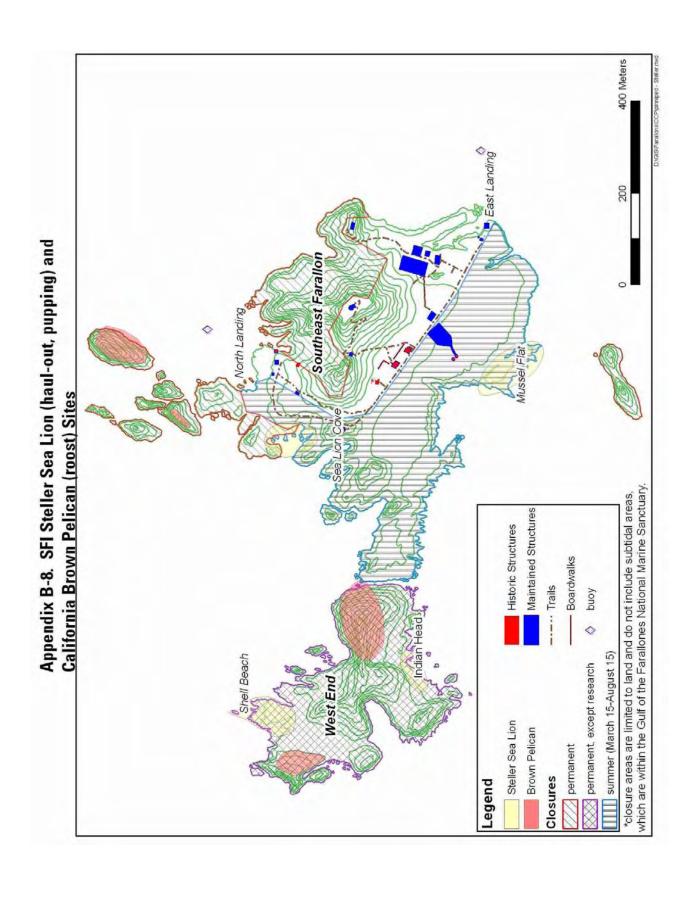












# **Appendix C. Glossary of Terms and Acronyms**

BLMBureau of Land Management

**CCNM** California Coastal National Monument CCPComprehensive Conservation Plan **CDFG** California Department of Fish and Game

 $\mathbf{E}\mathbf{A}$ Environmental Assessment

**Executive Order** EO

NOAA

EPAEnvironmental Protection Agency FAA Federal Aviation Administration

**GFNMS** Gulf of the Farallones National Marine

Sanctuary

**GGNRA** Golden Gate National Recreation Area GIS Geographic Information System Maintenance Management System MMS MOU Memorandum of Understanding National Environmental Policy Act NEPA **NMFS** National Marine Fisheries Service

Administration

National Oceanic and Atmospheric

**NRHP** National Register of Historic Places

NWR National Wildlife Refuge

NWRS/Refuge System National Wildlife Refuge System

NWS National Weather Service

OSPR Oil Spill Prevention and Response

PCB Polychlorinated biphenyls

Point Reyes Bird Observatory (PRBO **PRBO** 

Conservation Science)

**PRNS** Point Reyes National Seashore Refuge Farallon National Wildlife Refuge RONS Refuge Operating Needs System SEFI Southeast Farallon Island

SFI South Farallon Island

**SWQPA** State Water Quality Protection Area USFWS/Service U.S. Fish and Wildlife Service

USCG U.S. Coast Guard

WIMS Weed Information Management System

WSA Wilderness Study Area

1997 Improvement Act The National Wildlife Refuge System Improvement Act of 1997 (P.L. 105-57)

# Appendix D Farallon National Wildlife Refuge Draft Environmental Assessment

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# Chapter 1. Purpose and Need for Action

#### Introduction

This environmental assessment (EA), in accordance with the requirements of the National Environmental Policy Act (NEPA), evaluates the environmental effects of four alternatives for managing the Farallon National Wildlife Refuge (Refuge) as presented in the draft Comprehensive Conservation Plan (CCP). This assessment is being used by the Service to solicit public involvement in the refuge planning process and to determine whether implementing the CCP would have a significant effect on the quality of the human environment. This EA is part of the Service's decision-making process in accordance with the National Environmental Policy Act (NEPA).

# **Purpose and Need for Proposed Action**

The purpose and need for the proposed action develop a CCP that will provide a 15-year management plan for the Refuge and long-term guidance in relation to management decisions, as directed by the National Wildlife Refuge System Improvement Act of 1997 (1997 Improvement Act). The NEPA requires that an EA or Environmental Impact Statement (EIS) be prepared to accompany the CCP to evaluate the effects of different alternatives which meet the goals of the Refuge and identifies the Service's preferred alternative for implementing the CCP.

#### Plan Area

The Refuge is located off the northern California coast in San Francisco County, California, 28 miles west of San Francisco, the nearest point of mainland. The waters surrounding the Refuge are designated the Gulf of the Farallones National Marine Sanctuary (GFNMS), managed by NOAA. The Refuge comprises four island groups totaling approximately 211 acres. The Refuge provides breeding and/or resting habitat for 13 seabird species and five marine mammal species; it also supports an endemic subspecies of arboreal salamander and insect. Various landbirds, waterbirds, hoary bats, and occasionally other bats are present during migration periods. Some landbirds that arrive in the fall, including peregrine falcons and burrowing owls, may overwinter on the islands, but there are no regular breeding landbird species on the islands. Some rock outer tidal shorebirds, such as turnstones, surfbirds, and tattlers visit the island as well.

#### **Preferred Alternative**

The Service proposes implementing Alternative B, as described in this EA and the CCP for managing the Refuge.

#### **NEPA** and this Document

NEPA requires federal agencies to consider the environmental effects of actions¹ they propose to undertake. Federal agencies must also consider the environmental effects of a reasonable range of alternatives and make the public aware of the environmental effects of the preferred alternative and other reasonable alternatives. If adverse environmental effects cannot be avoided, NEPA requires an agency to show evidence of its efforts to reduce these adverse effects through mitigation. An EA documents that an agency has considered and addressed all these issues.

<sup>&</sup>lt;sup>1</sup> Under NEPA and implementing regulations, *action* refers to a policy, plan, program, or project that is implemented, funded, permitted, or controlled by a federal agency or agencies.

This analysis will help the Service determine if it will need to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) regarding the preferred alternative for the Refuge.

NEPA also requires the Service to give serious consideration to all reasonable alternatives for managing refuges, including the no-action alternative representing continuation of current conditions and management practices. Alternative management scenarios were developed as part of the planning process described in this EA.

This EA describes the existing resources on the Refuge and the projected environmental effects of the four management alternatives on those resources. Three of the four alternatives presented in this EA are *action alternatives* that would involve a change in the current management of the Refuge. The remaining alternative is the *no-action alternative*, under which current management of the Refuge would continue. A final CCP would be prepared regardless of which alternative is selected.

#### **Decisions to be Made**

The Service will select an alternative to implement the CCP on the basis of the assessment described in this document and the input received from the public during the comment process. Implementation of the plan could begin according to the timing requirement of NEPA. The plan will be monitored annually and revised when necessary.

## **Comprehensive Conservation Planning Process**

The Service developed the CCP using a systematic decision-making approach that encouraged public involvement in management decisions throughout the planning process. A planning team was assembled (see Chapter 5) of personnel from the Service's San Francisco Bay National Wildlife Refuge Complex and the California/Nevada Refuge Planning Office, the Point Reyes Bird Observatory Conservation Science (PRBO), and the U.S. Coast Guard (USCG). The Service contacted a wide array of people to participate, including representatives of federal agencies, Congress, state officials, state conservation agencies, conservation organizations, local interest groups, and other members of the public. These interested participants and local residents received announcements regarding the location, date, and time for the initial scoping meeting. At the scoping meeting the staff explained the Refuge's purpose, history, and laws and regulations governing management, as well as the purpose and need for the CCP and the relevant management activities and issues.

The planning team consists primarily of Refuge staff, Service technical experts, and other landowners of the Refuge (some Refuge lands are managed by the Service but owned by other public agencies). The team developed a list of issues and concerns that included comments generated from the scoping meeting, written comments, and verbal comments from discussions with various parties. The planning team reviewed the current Refuge management actions and ultimately presented four alternatives for future Refuge management during the planning process.

Key steps in the Service's comprehensive conservation planning process are listed below.

- 1. Preplanning.
- 2. Identifying issues and developing a vision statement.

- 3. Gathering information.
- 4. Analyzing resource relationships.
- 5. Developing alternatives and assessing environmental effects.
- 6. Identifying a preferred alternative.
- 7. Publishing the draft plan and NEPA document.
- 8. Addressing public comments on the draft plan.
- 9. Preparing the final plan.
- 10. Securing approval of the Regional Director.
- 11. Implementing the plan.

### Issues Identification

The Service followed NEPA guidelines and identified issues, concerns, and opportunities through early planning discussions and the public scoping process, which began with the first planning update in November 2005. The planning team identified a range of reasonable alternatives, evaluated the consequences of each alternative, and identified a preferred alternative for guiding the Refuge's future direction. This planning effort and the planning team's ongoing dialogue with various federal, state, and county agencies; interest groups; and individuals provided important direction in synthesizing the proposed goals, objectives, and strategies found in the draft CCP. It will be necessary to further coordinate and cooperate with these entities to implement the plan.

#### Public Involvement

Public involvement is an essential component of the comprehensive conservation planning and NEPA process. The Service announced the beginning of this planning effort for the Farallon National Wildlife Refuge through a Federal Register Notice of Intent on May 31, 2005. The Service sent individual letters announcing commencement of the planning process to several local organizations, the local city government, congressional members, state officials, state agencies, interested parties, and conservation organizations. Since November 2005, the Service has sent three planning updates to a mailing list of more than 100 individuals. Staff also held a public scoping meeting on May 25, 2005, in San Francisco, California.

Written public input received during the process is incorporated into the CCP and EA when feasible, and a summary of the comments is presented in the CCP. The original comments are maintained in planning team files at the San Francisco Bay National Wildlife Refuge Complex headquarters in Fremont, California, and are available for review.

#### U.S. Fish and Wildlife Service and National Wildlife Refuge System

The mission of the Service is working with others, to conserve, protect, and enhance the nation's fish and wildlife and their habitats for the continuing benefit of the American people. The Service is the primary federal agency responsible for migratory birds, endangered plants and animals, certain marine mammals, and interjurisdictional fish. This responsibility to conserve the nation's fish and wildlife resources is shared with other federal agencies as well as with state and tribal governments.

As part of this responsibility, the Service manages the National Wildlife Refuge System (Refuge System). The Refuge System is the only nationwide system of federal lands managed and protected for wildlife and their habitats. The mission of the Refuge System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for

the benefit of present and future generations of Americans. The Refuge is managed as part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966 as amended and other relevant legislation, executive orders, regulations, and policies.

# **Purposes of the Farallon National Wildlife Refuge**

The Refuge was established "...as a preserve and breeding ground for native birds." (Executive Order 1043, dated Feb. 27, 1909).

According to these authorities, the primary Refuge-wide purposes are:

- "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." (16 United States Code [USC]. 742f[a][4]) and "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 USC 742f[b][1], Fish and Wildlife Act of 1956).
- "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species..." (16 USC 460k-l, Refuge Recreation Act).
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 USC 715d (Migratory Bird Conservation Act of 1918).

#### Vision Statement

The imprint of California history and local wildlife is deeply embedded in the Farallon Islands, the largest seabird nesting colony in the contiguous United States. Refuge staff works to integrate the historic and future human imprint in a way that continues to enhance habitat and populations of nesting seabirds, marine mammals, and migratory species. Further, the human history and natural resources are shared with San Francisco Bay area residents and visitors. This is achieved in partnership with other organizations through monitoring, research, protection, and habitat restoration. Through high quality environmental education and interpretive opportunities, Bay Area residents and visitors are aware of and take stewardship of this jewel of the California coast.

#### Goals of the Refuge

Refuge goals were developed on the basis of four principles: wildlife management, habitat management, cultural resources and public access and education.

- **Goal 1:** Protect, inventory, monitor, and restore to historic levels breeding populations of 12 seabird species, five marine mammal species, and other native wildlife. Maintain and develop partnerships to support wildlife and habitat conservation on the Refuge.
- **Goal 2:** Restore degraded habitat and reduce the prevalence of nonnative vegetation in order to re-establish historic abundance and distribution of native plant species.
- **Goal 3:** Increase public awareness of the marine environment and the Refuge's purposes through wildlife-dependent recreation, environmental education, and interpretation opportunities, while preserving and enhancing wildlife populations and the wilderness character of the Refuge.

**Goal 4:** Inventory and preserve the valuable cultural and wilderness elements of the Refuge in order to chronicle the history of the Farallon Islands and share this knowledge with the San Francisco Bay Area community and the public as a whole.

# Chapter 2. Alternatives, Including the Preferred Alternative

## **Alternatives Development Process**

Four alternatives were developed to manage the Farallon Refuge.

- Alternative A: current management (no action).
- Alternative B: expand resource management, and increase public education and outreach. (preferred alternative)
- Alternative C: expand resource management, increase public education and outreach, and develop a visitor services plan that evaluates on-site wildlife-dependent recreation opportunities.
- Alternative D: reduce human presence through closures of certain areas to monitoring and management activities, increase public education and outreach.

The alternatives development process was an iterative process that began after the planning team developed the Refuge vision statement and revised the Refuge's goals. The first step in this process was to identify all the important issues related to Refuge management. The list of issues was generated collaboratively by the core planning team, Service staff, and Refuge stakeholders. The public also helped to identify important management issues through the scoping process.

Once the list of important management issues was generated, the planning team described Alternative A (no action). It was important to describe this alternative accurately because the no-action alternative serves as the baseline against which all other alternatives are compared.

Next, the planning team listed a wide range of management actions that would address the issues identified and would achieve one or more of the Refuge goals. These actions were refined during several meetings and planning team reviews. The planning team then clustered these actions into logical groupings to form the action alternatives. Many actions are common to more than one alternative, but the actions within each alternative reflect a common management approach, as described in detail below. The staff then assessed physical, biological, economic, and social aspects affecting the Refuge to select the preferred alternative.

These alternatives are described below and summarized in Table 1 at the end of this chapter. All alternatives considered in this EA were developed with the mission of the Refuge System and the purposes of the Refuge as guiding principles. The Service's preferred alternative is Alternative B.

#### **Description of Management Alternatives**

Alternative A: Current Management (No Action)

Under Alternative A, the Service would continue to manage the Refuge as it has done in the recent past. The focus of the Refuge would remain the same: to provide breeding and resting habitat for migratory seabirds and pinnipeds. The Refuge would continue to be closed to general public access. The Refuge would continue to be staffed with a small number of people (3–8) to monitor wildlife, protect wildlife from human disturbance, restore habitats, and maintain facilities. Special Use Permits (SUPs) would be issued on a case-by-case basis to members of the media and outside researchers meeting certain criteria.

Habitat Management. Under Alternative A, the Service would continue to remove nonnative vegetation through hand removal and herbicide treatment. Volunteers would continue to provide vegetation surveys every few years. Intertidal surveys would continue to be conducted by GFNMS two to three times per year.

Migratory Birds and Marine Mammals. Under Alternative A, the Service would continue to monitor seabird and marine mammal population size and reproduction through a cooperative agreement with PRBO. In addition to monitoring, investigations on diet and other life history parameters would be continued. Limited monitoring of other wildlife (e.g., landbirds, salamanders, bats) on the Refuge would also continue. Ecosystem-based research would be permitted on a case by case basis under Special Use Permits. Wildlife would continue to be protected from most external disturbances (i.e., boating and aircraft) by the presence of a permanent staff and closure to the general public. There are also designated areas on the Refuge where staff are not allowed. Staff would continue to report any violations and as appropriate, refer instances of wildlife disturbances for prosecution. Oil spill response would continue to be coordinated with other partners.

Threatened and Endangered Species. Species listed under the Federal Endangered Species Act (ESA)—Steller sea lion and California brown pelican—breed or roost on the Refuge. Currently, staff presence protects these species from human disturbance by contacting boats or planes that might disturb wildlife, and reporting violations. Staff also limits their own impacts to listed species by closing certain areas of SFI permanently and seasonally to human access. Population and reproductive monitoring are also conducted for the Steller sea lion. Numbers of roosting California brown pelicans are counted daily by PRBO, and the population counts are reported monthly to the Refuge. Because California brown pelicans only roost seasonally at the Refuge, indepth studies are not conducted on these species.

#### Public Access and Education

The Refuge is closed to public visitation to protect wildlife and sensitive habitat from human disturbance. Safety is also a consideration. Steep rocky topography prevents boat landings on all islands except for SEFI. Embarking onto SEFI can be challenging, is weather dependent, and requires special equipment (e.g., landing derrick, shuttle boat) as well as a fair amount of strength and agility. These demands, together with uncertainties involving equipment reliability, make access dangerous for the public. Public outreach would continue to be conducted through occasional media visits and boat tours (around the Refuge) by other private groups. The Service would issue one to three SUPs per year for print or broadcast media. A SUP usually authorizes one to three journalists for a one-day visit; with a maximum of one multi-day visit per year. Volunteer opportunities for weed management or construction provide public opportunities.

Boat tours take visitors close enough to the Refuge to see seabirds nesting on cliffs and marine mammals resting along the shoreline, but the visitors do not disembark. An average of 3,350 visitors per year tour the Refuge on day trips operated by commercial operators in the San Francisco Bay Area. The waters off the Refuge are open to boating and fishing, but boat distances from the Refuge are regulated by California Department of Fish and Game (CDFG).

#### Cultural Resources

The Refuge contains several cultural features that have been assessed by the Service's archaeology branch. These features are described in Chapter 3, Refuge and Resource

Description, of the CCP. Under Alternative A, the Refuge would continue to maintain known historic structures and archaeological sites on the Refuge. Any construction activity that may affect unknown cultural resources would be reviewed by Service cultural resources staff to assess impacts on cultural resources on the Refuge.

#### Wilderness

Portions of the Refuge are designated as Wilderness Area which requires these areas to be managed in ways that preserve their wilderness character. The use of motorized equipment, motorized vehicles, motorboats, or aircraft is prohibited in Wilderness Areas. Staff would only be allowed to traverse the area by foot. Staff access West End by boat and foot to monitor pinnipeds. Aerial surveys over wilderness areas are conducted annually to count seabirds and pinnipeds.

Alternative B: Expand Resource Management; Increase Public Education and Outreach (preferred alternative)

Habitat Management. Under Alternative B, the Service would continue habitat management activities as described for Alternative A, but would also develop consistent protocols for restoration, monitoring, and control of invasive plants, including removal of the majority of nonnative plants on the Refuge (primarily on SEFI), and to prevent other nonnative plants from becoming established. Nonnative plants are believed to have been introduced to the Refuge primarily through human activity, although transport by wind and birds, especially gulls, has likely occurred as well. Under Alternative B, New Zealand spinach and cheeseweed would be the two priority invasive species targeted for 95 percent removal. Within the first ten years of the plan, spinach and cheeseweed will be reduced by 50 percent. Removal methods include hand-pulling (intermittently from November through early January and intensively from January through mid-March) and hand-spraying individual plants with herbicide (one week application in mid-August, with follow-up application, as needed, in September or October). Other potential methods may also be explored during the life of the CCP.

A similar strategy will be developed to apply grass-specific herbicides to control invasive nonnative grasses and plantain. Application of this herbicide is expected to occur during the winter and spring, prior to the arrival of breeding seabirds. The duration of application is expected to be similar to spinach and cheeseweed removal, but will be clarified through annual grass control plans because the activity is relatively new.

Excess infrastructure would either be removed or used for additional seabird nesting habitat, particularly on the Marine Terrace. Removal or reuse of excess, clean infrastructure will take place intermittently as funds and needs allow with procedures and during periods that will have reduced disturbance to wildlife and habitat.

The Service would also implement native plant restoration, which involves expanding the collection and planting of maritime goldfields seed. These efforts would be monitored using geographic information system (GIS) to determine efficacy. Seeds would be collected from the Refuge in summer and fall. Seeds would be sowed coinciding with the first winter rains. Plant propagation would also be explored. Different methods and plots would be tested. More details on weed management can be found in Appendix N of the CCP. This plan will be updated to review survey protocols, assess needs for additional closures to staff, and consider additional plant management efforts.

Under this alternative, the Service will continue to allow surveys of the intertidal areas by partner agencies. Although no management activities are currently in place or planned for the intertidal areas, intertidal monitoring provides important baseline information in the event of an oil spill, disease outbreaks, and for examining the effects of climate change. The Service would work with other agencies to assess and address drummed hazardous and radioactive waste near the Refuge. The Service would also continue to monitor on-site contaminants.

The Service will conduct analyses that will estimate habitat changes based on climate change scenarios and seek out partnerships with other agencies to respond to climate change. Monitoring for climate change indicators (e.g., temperature, sea-level, prey availability, and arrival/departure dates of wildlife) will provide long-term information to inform management decisions.

Migratory Birds and Marine Mammals. Except for limited media visits, the Refuge would continue to be closed to public access to protect seabirds, marine mammals, and their habitats from disturbance. Nearly every square foot of SFI is utilized for nesting, roosting, pupping, or as a haul-out site. The Refuge would update existing GIS maps of seabird and pinniped colony locations. Staff access to West End would be restricted to no more than six visits between September through October and no more than six visits between January through February to limit disturbance to wildlife.

Seabirds and pinnipeds would continue to be monitored for population size and breeding success, but some studies and data would be refined. Diet and other ongoing studies of seabird life history parameters would continue. New studies that fill priority information or management need, or contribute to protection, enhancement, or management of native Farallon wildlife populations or their habitats would be encouraged. Priority species include storm-petrels and auklet species. GIS maps would be updated to track the movement of species. Additional techniques (e.g., remote camera system) could also be implemented to improve monitoring of all species.

The Service would also review and contribute to regional fisheries and other ocean-based plans by providing information on seabird and pinniped population seasonal occurrence patterns and diet collected from the Refuge over the past 40 years. Research would also be integrated into larger study needs in the field of climate variability, climate change, and marine protected areas.

Landbirds would continue to be monitored in the fall and, as resources allow, during other seasons. Protocols would be reviewed and revised if necessary. The landbird dataset would be examined and analyzed to support development of management strategies for burrowing owls and other seabird predators. Wintering burrowing owls would be trapped and translocated to the mainland until house mice can be eradicated.

In recent years, the Refuge has become aware of the impact of nonnative house mice on the ashy storm-petrel population. The Service would develop and implement a house mouse eradication plan in order to reduce seabird mortality as well as restore other elements of the natural biological integrity of the Farallons. The proposed eradication plan would include the use of rodenticide when seabirds and pinnipeds are not breeding on the Refuge. It is important to note that eradication methods are not explored in depth in this document and will be further analyzed in a subsequent environmental plan and documentation.

Western gull predation on ashy storm-petrels is another concern that would be reduced by removing individual specialist gulls. Gull nests would be monitored for presence of storm-petrel remains. A pilot program to euthanize up to ten specialist gulls would be conducted annually through a Migratory Bird Treaty Act permit. This program would be monitored over several years to determine its efficacy on reducing predation pressure on ashy storm-petrels.

Habitat for crevice-nesting seabirds such as ashy storm-petrels, pigeon guillemots, and auklets would be enhanced by maintaining the Lighthouse Hill Trail to be bird-friendly, removing derelict foundations, and creating nesting structures with recycled rubble and building foundations.

Northern fur seals recolonized the Refuge as a breeding site in 1996. Population size and pup production have recently been growing exponentially, but there has been little population monitoring because the seals primarily use an area on West End (designated as Wilderness) that is not visible from SEFI. Under this alternative, the Service would investigate and implement techniques (e.g., remote camera system) to better monitor fur seals without disturbing nesting seabirds or marine mammals.

Staff would also participate in plans that reduce fisheries interaction by participating in working groups or providing comments to reduce impacts on seabirds. Staff would also coordinate with law enforcement from other agencies to reduce disturbance to wildlife. Staff would also work with other agencies to deploy buoys for additional closures, such as the state Special Closures anticipated under the Marine Life Protection Initiative. Staff would also work to have aeronautical and navigation charts updated to improve visibility of the Refuge among those target communities. Coordination and training would be improved for oil spill response.

Threatened and Endangered Species. Under this alternative, the Refuge would continue to reduce this disturbance by monitoring and reporting boating and aircraft incidents that cause these species to flush or show other signs of disturbance. Staff would also work to implement recovery plan objectives. In addition, an outreach program to pilots, boaters, and the public would also be undertaken. Further research on Steller sea lions would be encouraged to understand limiting factors and enhancement opportunities. The Refuge would also coordinate monitoring and research with other regional colonies being studied. California brown pelican would continue to be monitored and roosting habitat would be mapped to understand movement of the species. Where possible, objectives from the recovery plan will be implemented.

Other Species. The arboreal salamander pilot monitoring study would be continued and expanded to obtain more information on population size and distribution of salamanders. Sightings of migrant whales, other pinnipeds, intertidal species, and butterflies would continue to be documented. Protocols for monitoring bats would be reviewed and revised if necessary. Longterm data collected for hoary bats would be analyzed. Non-intrusive research studies to expand our understanding of the Refuge's lesser known fauna would be encouraged, such as insects and invertebrates.

Public Access and Education. Under this alternative, the Refuge would remain closed to the public similar to Alternative A. However, the Service would develop and maintain a workshop for charter boat staff and naturalists to enhance off-refuge tours. Staff will conduct docent and interpretive specialist training to expand public outreach about the Refuge. Such enhancements could include educational materials and interactions between the Refuge staff and the wildlife tour

boats.

Off the Refuge, environmental education would be expanded at partner visitor centers. Educational materials and interpretive displays would be updated for school and public programs. The existing website would be improved and expanded to provide real-time information and visuals. A web camera would be installed for the seabird and marine mammal breeding season and video from the camera would be made accessible at the Refuge, partner visitor centers, and possibly the internet to provide interactive, virtual "public access". The existing marine mammal and seabird interpretation program at local schools would be further enhanced.

A group media tour will be organized annually by Refuge staff to facilitate outreach to the larger public through media publications and programs. One- to three-person media visits (up to three per year) would continue to be authorized under an SUP at current levels, including a maximum of one multi-day visit per year. Visits would be contingent on logistical, weather, and financial considerations. Outreach for volunteer opportunities to support management and conservation needs would be improved.

Fishing is not allowed on the Refuge, but regulated in the water surrounding the Refuge by CDFG. Fishing would continue to be allowed by boat in the waters off the Refuge, but boat distance (based on state regulations) from the Refuge must be adhered.

Cultural Resources. Under Alternative B, cultural resource elements would be inventoried and preserved. This information would be used to develop interpretive displays and educational materials for outreach at school programs and public events. Possible cultural resources on the North Farallons would also be assessed within the life of the plan.

Wilderness. The North Farallon Islands would be visited at least once in the life of the plan to conduct an assessment of its resources. Boat-based (no landing) or aerial surveys of the North Farallons would occur annually. No motorized equipment will be used on the island. Vegetation management, such as nonnative plant mapping on West End will be limited to twice per year, and a monitoring and restoration plan will be developed. Methods would be compatible with maintaining wilderness characteristics including removal by hand or herbicide treatment of individual plants.

As mentioned in the previous wildlife management section, staff would be limited to no more than six visits between September and October, and no more than six visits between January and February to limit wildlife disturbance. The purposes of these visits specifically would be to monitor pinnipeds during the seabird non-breeding season and to conduct crevice-/burrow-nesting surveys.

Vegetation surveys and control of nonnative vegetation would be conducted no more than twice per year during the non-breeding season. House mouse eradication activities would also take place on West End. Rodenticide application methods, timing, and protocols will be analyzed further in a subsequent environmental document. A Minimum Requirements Decision Process will be conducted to determine the most appropriate method to conduct the eradication in designated Wilderness.

Alternative C: Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On-Site Wildlife-Dependent Recreation Opportunities

Habitat Management. Habitat management activities would be conducted as described in Alternative B. In addition, the Service would evaluate the need to close additional areas of the Refuge to protect native plant areas from the effects of increased human presence resulting from any types of on-site public opportunities developed in the visitor services plan. Increased monitoring would be added under this alternative to keep abreast of introductions of nonnative vegetation that could result from public activities.

Migratory Birds and Marine Mammals. Under this alternative, the Refuge staff would conduct migratory bird and marine mammal activities as described in Alternative B. In addition, general studies on foraging ecology, broader ecosystem-based research, and studies investigating environmental change effects on Refuge wildlife would be permitted under Special Use Permits.

Threatened and Endangered Species. Protection of listed species would be the same as described for Alternative B.

Public Access and Education. Under Alternative C, public access and education activities would include those described for Alternative B. In addition, Alternative C would include developing a visitor services plan that further assesses visitor activities off-site and on-site. On-site visitor activities that will be evaluated include the potential for group media tours, guided tours and volunteer opportunities. Potential approved refuge uses that may be achieved through these opportunities include wildlife photography, wildlife observation, environmental education and interpretation. The two other approved public uses, hunting and fishing, will not be considered. There are no species on the Refuge that are appropriate for hunting, and there are no safe locations on the Refuge to provide good quality fishing.

Cultural Resources. Cultural resource activities would be conducted as described for Alternative B. In addition, cultural resource interpretation would be considered in conjunction with the analysis of possible wildlife-dependent recreational opportunities on the Refuge.

Wilderness. Activities in wilderness areas will be the same as conducted in Alternative B.

Alternative D: Reduce Human Presence through Closures of Certain Areas to Monitoring and Management Activities; Increase Public Education and Outreach

Habitat Management. Habitat management activities under Alternative D would be the same as under Alternative B. However, human access to North Landing (except for emergency or safety situations), portions of Lighthouse Hill, and additional areas would be prohibited during the seabird nesting season to reduce disturbance and encourage expansion of nesting habitat. Such reduced access would decrease the spread of invasive plants. However, reduced access could also limit detection of potential nonnative vegetation expansion. Designated wilderness areas would be closed to foot traffic; these areas would only be monitored by boat.

Migratory Birds and Marine Mammals. Under this alternative, monitoring and data collection

of wildlife would be reduced. Web cameras (installed during the non-breeding season) would be relied on as a means to allow monitoring in lieu of human access. The closure of certain areas listed above would reduce data collection for most species on the Refuge such as common murre, pelagic cormorant, ashy storm-petrel, Cassin's auklet, pigeon guillemot, northern elephant seal, and northern fur seal. Burrow and crevice monitoring would be reduced to protect habitat and prevent disturbance. A mouse eradication plan and removal of problem gulls would still be developed and implemented as prescribed in Alternative B.

Threatened and Endangered Species. Protection of listed species would the same as described for Alternative B.

Public Access and Education. Access and education would be the same as Alternative B.

Cultural Resources. Cultural resource activities would be conducted as described for Alternative B.

Wilderness. Activities in Wilderness Areas will be conducted as in Alternative B.

#### **Features Common to All Alternatives**

#### Nonnative Plant Management

All the alternatives prescribe some level of plant restoration. Nonnative plants, introduced primarily by human vectors, have dramatically altered the natural landscape of SEFI. All alternatives call for the removal of plants by hand-pulling and herbicide application.

#### Cultural Resources

Not all objects or structures on the Refuge have been assessed. All the alternatives will consider efforts to assess and maintain culturally important resources. Structures are assessed by the Cultural Resources branch of the Service when there are renovation needs.

#### Environmental Education

Environmental education is crucial to a remote Refuge. Currently, environmental education is conducted at schools along the coast and near the San Francisco Bay NWR Complex. All the alternatives would continue to provide environmental education to local San Francisco Bay area schools and visitor centers.

#### Wildlife Observation and Photography

Wildlife observation is prescribed in all of the alternatives. Under all the alternatives, the public is able to visit the Refuge by boat, but not allowed to land on the Refuge.

#### **Features Common to Action Alternatives**

#### Plant Restoration Plan

All action alternatives include a component to develop a restoration plan that will map and monitor plant restoration activities over time to measure the efficacy of restoration efforts. This plan will include development of protocols to prevent future introductions of nonnative plants.

#### Nonnative House Mouse Eradication

House mice would be eradicated under all the action alternatives. Rodenticide would be applied to SEFI and West End during the non-breeding season. It is anticipated that the activity will take place over a one-time, two-week period. The method of application will be determined through a separate environmental assessment subsequent to this CCP.

#### $Removal\ of\ Excess\ Infrastructure$

The Refuge has had a long history of human presence, some debris and unused infrastructure remains from previous occupancy. This excess material is located primarily on the Marine Terrace of SEFI. These materials would be removed when they pose a threat to human safety or are a wildlife hazard, or as funds become available. Removal or reuse of materials could provide additional habitat for wildlife. Prior to removal, these materials are evaluated for historic importance by the Service's cultural resource specialists. The action alternatives would include an assessment of existing infrastructure and the development of a timeframe for removal or reuse as wildlife habitat.

#### Wildlife Monitoring and Research

Monitoring and research are the primary activities conducted on the Refuge. Eleven of twelve species of birds (Leach's storm-petrels are only banded) and five species of pinnipeds are monitored on the Refuge. Research studies are conducted on some of these species. The primary difference between Alternative B and C is that permitted research under Alternative B would still have to meet the criteria of being focused on a refuge information need, while research would be expanded to include topics that benefited conservation of wildlife in general and understanding of marine ecosystems in Alternative C. It is therefore anticipated that more research would occur under Alternative C because criteria is less restrictive. Alternative D would reduce monitoring and research to allow birds to expand their nesting habitat.

# Climate Change

Each of the action alternatives prescribes actions to address climate change. Actions include working with relevant partners and conducting monitoring to track local changes (e.g., temperature variation, arrival/departure of species, breeding times, and sea-level rise).

#### Alternatives Considered but Eliminated from Detailed Analysis

#### Unlimited Public Access

Unlimited public access was dismissed from further analysis due to resource sensitivity, safety concerns, logistical constraints, and incompatibility with Refuge purposes. Unlimited public access would be unreliable due to weather and equipment unpredictability. Additionally, unlimited access would necessitate a larger staff to host visitors. Water and power resources are insufficient to support a larger staff and unlimited visitors. SEFI is the only part of the Refuge where access could be allowed on the Refuge because it has equipment to transport visitors ashore. Access to the islands requires significant support from island staff due to the rocky shoreline of the SEFI. Visitors would need to be transported onto the island by small boat and a landing platform. However, visitors could not be guaranteed access onto SEFI given the variability of weather and tides, in addition to landing equipment unpredictability.

Allowing unlimited public access would introduce the potential for major wildlife and habitat

disturbance. The majority of land on SEFI is used by wildlife as haul-out, roosting, and nesting sites. Nests and burrows are located all over the Refuge and could be easily damaged by human traffic. Public access would increase the potential for habitat loss. Moreover, because the Refuge hosts globally significant wildlife populations, any major human disturbances could result not only in repercussions to a specific colony, but to overall populations.

#### Seasonal Access for Field Station Staff

Seasonal access was eliminated from detailed analysis because it would conflict with the Refuge's purpose of protecting and restoring seabird populations. Limiting access for Refuge or PRBO staff would result in reduced research and monitoring of wildlife, as well as reduced protection of wildlife from human disturbance. Accessing the Refuge on a limited basis would not provide protection from boat and aircraft disturbance, which are known threats to wildlife on the Refuge. In addition, the infrastructure required to access SEFI needs continual maintenance. The landing crane requires continual upkeep and a power source that could not be maintained under seasonal access. Changing weather conditions and SEFI's rocky shoreline preclude staff from simply boating up to the island.

#### No Access

Eliminating all access to the Refuge, including Refuge staff, was considered but dismissed from detailed analysis because it would conflict with the Refuge purpose of protecting and restoring seabird and marine mammal populations. Eliminating access for Refuge staff would result in reduced research and monitoring of wildlife. While the removal of human presence might increase the extent of available habitat, wildlife would likely be more susceptible to aircraft and boating disturbance in the absence of existing staff surveillance and enforcement. Without a small but vigilant human presence on SEFI to prevent boats and aircraft from approaching too close to or landing on the island, seabirds and marine mammals would be flushed from nesting colonies, possibly during critical times in the breeding season.

Aircraft flying lower than 1,000 feet over the island, and boats approaching too close to the shoreline, have been observed flushing seabirds and marine mammals, and are therefore treated as potential violations of Service regulations. When such an incident occurs, island personnel immediately attempt to make contact with the pilot or skipper, advising them to alter their course or face a potential citation. A vessel description, identification numbers, activity description, and any wildlife disturbance are carefully noted and sent to Refuge law enforcement or other appropriate enforcement agencies. Refuge officers follow up with appropriate action—either a warning or citation. This approach has been successful in reducing the number of low-level flights, from an annual average of five to ten prior to 2002 to three or fewer in 2006.

The California Code of Regulations prohibits boats from approaching within 300 feet of certain portions of the shoreline between March 15 and August 15. Due to the Refuge's remoteness and unpredictable sea conditions, this regulation is difficult for CDFG to enforce. Island personnel are in contact with fisherman and other boaters on a regular basis, informing them of the regulations and documenting any violations. Approximately 8–10 violations of the CDFG closed area are recorded each year; some of these cause some level of wildlife disturbance.

It is believed that the frequency and magnitude of human-caused disturbance would increase if personnel were removed from the Refuge. Prior to establishment of a human presence in the 1960s, USCG informed the Service that quite a few people landed on the islands at various times

to the detriment of nesting colonies of Brandt's cormorant, whose nestlings were heavily preyed upon by gulls (Gene Kridler pers. comm. July 2, 2005). Trespassers have also killed gulls and sea lions (Farallon journals, unpublished; White 1995). Even now people occasionally try to land on the island but are intercepted and escorted off the island before they cause any significant damage.

Because many seabirds lay only one egg per year, even one human disturbance event during a critical time of the nesting season (egg laying, chick rearing) can cause reproductive failure of cliff-nesting species (e.g., common murre) for that season. Repeated disturbances could cause abandonment of an entire colony.

If an unauthorized landing were to involve the introduction of a mammal (e.g., cat, rat, rabbit) other burrowing seabirds could be extirpated as well. The consequences of introduced mammalian predators and competitors on island species are well documented (Copson 1986, McChesney and Tershey 1998, Faulkner et al. 2001, Keitt et al. 2002). Prior to Refuge acquisition of SEFI in 1969, nonnative cats and rabbits were present. Following their removal, groundnesting seabird populations rebounded, and rhinoceros auklet returned as a nesting species.

Without a small staff on the island, the Service would be unable to document and respond to off-Refuge events that affect Refuge wildlife. Long-term monitoring of common murre populations and documented gillnet mortality contributed to closure of the near-shore set net gillnet fishery near the islands in 1987. In 2003, island personnel documented the emergence of squid fishing close to the island and its potential effects on nocturnal seabirds such as ashy storm-petrels and Cassin's auklets. Following presentations by Refuge and PRBO staff to the California Fish and Game Commission, the waters surrounding the Refuge were closed to night fishing for squid, which utilized extremely bright lights.

Oil spills are another threat to seabirds in general, and common murres in particular, that nest on the Refuge. Refuge personnel record all oiled wildlife daily, reporting any unusual incidents or increases to the Oil Spill Prevention and Response Division of CDFG. When a spill event is suspected, Refuge staff collects oiled birds or carcasses for evidence. Several successful cases (i.e. Apex-Houston, Command, Luckenbach) resulting in large financial settlements and restoration of seabirds and habitat, have been based on documentation collected by Refuge staff. Collecting oil spill impacts to seabirds may also explain population-level effects over time.

Removing the human presence on the island would also impede the Service's ability to fulfill its public outreach mission. Journalists and other media personnel are periodically granted access to write articles or to film news segments and documentaries. Refuge staff people have intimate knowledge of resident wildlife and can supervise these limited access events in a manner that greatly reduces disturbance while at the same time allowing the public an opportunity to learn about the Refuge's resources. Refuge staff also communicates with charter boat operators that bring people out to see the Refuge from the water.

The combination of restricted public access and staff presence has facilitated the recolonization of once extirpated species to the Refuge. Historical estimates indicate that at least 400,000 common murres and over 100,000 of northern fur seals once populated the Farallon Islands. Fur seals have only recently returned as a breeding species after an absence of more than 150 years. Common murres have slowly rebuilt from a low point of just a few thousand in the early 1900s to

more than 250,000 today. Wildlife still remains vulnerable to human disturbance, nonnative species, oil spills, and other off-Refuge events that cannot be predicted. Removing island staff (and consequently removing impediments to unauthorized public access) would reverse gains in wildlife protection and restoration that have occurred since the Refuge was established.

**Table 1. Summary of Alternatives** 

Issue Area  Wildlife Management	Alternative A No Action (Current Management)  Monitor broading populations	Alternative B Expand resource management, research, and public education and outreach (preferred alternative)  • Same as Alt. A, but:	Alternative C Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities  Same as Alt. B, but:	Alternative D Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach  • Same as Alt. A, but:
Wildlife Management	<ul> <li>Monitor breeding populations and breeding success of 11 seabird and five pinniped species.</li> <li>Census and collect reproduction and resighting information weekly for elephant seals.</li> <li>Identify threats and options for removing them; conduct investigations of diet and other life history parameters of selected seabirds and pinnipeds.</li> <li>Monitor wildlife response to habitat restoration and other management activities.</li> <li>Monitor and quantify landbird arrivals during fall migration.</li> <li>Record observations of whales, bats, salamanders, butterflies, insects, and other non-bird migratory species.</li> <li>Continue to allow intertidal studies for baseline data collection.</li> <li>Permit ecosystem-based research on a case-by-case basis.</li> </ul>	<ul> <li>Same as Alt. A, but:</li> <li>Coordinate law enforcement and outreach (to boaters and pilots) with other agencies to reduce disturbance to wildlife.</li> <li>Initiate/support studies that focus on foraging ecology of breeding birds on SEFI.</li> <li>Investigate new techniques (e.g., remote camera system) or protocols to monitor growth and reproduction, especially of the northern fur seal colony on West End.</li> <li>Review and contribute to regional fisheries, emerging fisheries and other ocean-based management plans to identify problems and solutions that relate to foraging seabirds.</li> <li>Work with cooperators to contribute seabird and pinniped monitoring data to regional efforts and other large-scale monitoring efforts.</li> <li>Establish and maintain a variety of partnerships to collaborate on ecosystem-based and other joint research projects.</li> <li>Integrate research on Farallon wildlife into studies on marine ecological consequences of climate variability and change, marine protected areas, marine ecosystem conservation, and fisheries management.</li> <li>Re-conduct an island-wide survey of the Cassin's and rhinoceros auklet breeding populations. Refine methods of tracking populations. Refine methods of tracking population trends.</li> <li>Reassess breeding population size and trends of ashy and Leach's storm-petrels by refining survey methodology. Conduct a status assessment of these species including limiting factors and conservation recommendations.</li> <li>Continue to refine and update GIS map of seabird colonies and pinniped haul-</li> </ul>	Same as Alt. B, but:     Permit/encourage on-island research focused on broad ecosystem questions that support the conservation of Refuge wildlife.	<ul> <li>Same as Alt. A, but:</li> <li>Close North Landing, a portion of Lighthouse Hill, and other feasible areas during the seabird nesting season to provide additional nesting habitat.</li> <li>Limit data collection on most species such as ashy stormpetrel, Cassin's auklet, northern elephant seal, northern fur seal, pigeon guillemot, common murre, and pelagic cormorant species to increase habitat at North Landing, Lighthouse Hill, and other feasible sites.</li> </ul>

Issue Area	Alternative A	Alternative B	Alternative C	Alternative D
Issue Alea	No Action (Current Management)	Expand resource management, research, and public education and outreach (preferred alternative)	Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities	Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach
		<ul> <li>out/pupping areas.</li> <li>Prepare supplemental NEPA documentation and permitting and secure funding to eradicate nonnative house mouse; develop a plan to prevent future rodent introductions, and detect and respond to rodent introductions.</li> <li>Monitor and reduce predation on sensitive seabird species by western gull; study extent of problem and conduct a pilot program that euthanizes no more than 10 specialist gulls annually to lower predation rates.</li> <li>Until mice are eradicated, continue to translocate individual problem burrowing owls.</li> <li>Review/revise monitoring and research plan for landbirds.</li> <li>Expand arboreal salamander and hoary bat surveys to fall/winter annual data collection.</li> <li>Encourage non-intrusive research studies that would help inventory and understand some of the Refuge's lesser known fauna, such as insects, bats, pinnipeds, intertidal species, and salamanders.</li> </ul>		
Endangered Species Management	<ul> <li>Protect species from human disturbance.</li> <li>Monitor population and reproduction of Steller sea lion.</li> <li>Conduct daily population counts of roosting California brown pelicans.</li> </ul>	<ul> <li>Reduce disturbance to threatened/endangered species by improving coordination in monitoring and reporting boat and aircraft disturbance.</li> <li>Encourage additional Steller sea lion research to determine limiting factors to reproductive success, causes of declining breeding populations, enhancement opportunities; and coordinate with research at other Steller colonies.</li> <li>Implement action items from the recovery plans.</li> <li>Note unusual mortality events, and incidental and direct take of Steller sea lions and report to NMFS.</li> <li>Implement recovery plan objectives to protect</li> </ul>	• Same as Alt. B.	• Same as Alt. B.

Issue Area	Alternative A No Action (Current Management)	Alternative B Expand resource management, research, and public education and outreach (preferred alternative)	Alternative C Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities	Alternative D Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach
		post-breeding roosting habitat on the Refuge for California brown pelicans.  Include California brown pelican and Steller sea lion information in outreach activities and materials.		
Fire Management	Refuge exempt from fire management plan preparation (no burnable acres).	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.
Habitat Management	Hand removal and herbicide spraying of New Zealand spinach and cheeseweed to prevent expansion into new areas and reduce density.     Create nesting habitat using excess infrastructure.     Collect maritime goldfield seeds and seed areas.     Close areas to staff during sensitive seasons.     Remove excess infrastructure when possible.	<ul> <li>Same as Alt. A, but:</li> <li>Develop a plan to reduce the percent cover of New Zealand spinach and cheeseweed by 50 percent in 10 years and eradication of 95 percent of these species in the long-term by hand spraying herbicide, and manual pulling, and other potential methods.</li> <li>Restore native plant cover by expanding maritime goldfield seed collection in the fall and summer, and expand outplanting areas. Assess potential for goldfield and other native plant propagation and planting.</li> <li>Develop and implement standard operating procedures to prevent future introductions (e.g., seed spread) or spread of nonnative species.</li> <li>Develop and implement a strategy to eradicate or significantly reduce the cover of other nonnative plants, such as grasses and plantain.</li> <li>Use weed information management system, global positioning system, and GIS to track vegetation types and management areas.</li> <li>Monitor and document management efforts for success of control measures and responses of seabirds.</li> <li>Establish experimental plots to assess the efficacy of different restoration techniques.</li> <li>Analyze all existing plant data and management efforts and prepare a report on past vegetation management.</li> <li>Finalize draft plant sampling protocols and</li> </ul>	Same as Alt. B; but:     Evaluate need for additional closed areas to protect native plant areas from increased human presence.	Close trail to North Landing and portion of Lighthouse Trail seasonally to reduce spread of invasive species.

Issue Area	Alternative A No Action (Current Management)	Alternative B Expand resource management, research, and public education and outreach (preferred alternative)	Alternative C Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities	Alternative D Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach
		<ul> <li>manual.</li> <li>Identify and prioritize for removal of unnecessary debris and manmade structures, primarily on Marine Terrace.</li> <li>Utilize clean excess materials for seabird nesting habitat, primarily in Sea Lion Cove.</li> <li>Maintain and enhance Lighthouse Trail for crevice-nesting species and safe access to the lighthouse.</li> <li>Assess need to implement additional seasonal and year-round closures in sensitive habitat and areas where access is not necessary to monitor wildlife or maintain operations to reduce habitat impacts and invasive plant dispersal (include procedures to enter closed areas).</li> </ul>		
Wilderness Management	<ul> <li>Limited access for elephant seal and northern fur seal monitoring purposes only.</li> <li>Survey seabirds and pinnipeds on SFI wilderness areas from land-based vantage points on SEFI, with annual boat surveys of breeding seabirds.</li> <li>Conduct annual aerial surveys of breeding common murres, Brandt's cormorants, and double-crested cormorants on all islands.</li> <li>Conduct near annual aerial surveys of Steller sea lions in coordination with NMFS.</li> </ul>	<ul> <li>Limit research access to West End to only those surveys needed to assess pinniped population levels and pup numbers: six visits between September and October to assess the expanding fur seal colony and six visits between January and February to monitor elephant seals.</li> <li>Develop an inventory and monitoring plan for West End. Develop a vegetation restoration plan and map for West End, limit visits to twice per year during the non-breeding season.</li> <li>Eliminate nonnative house mice on the West End using methods compatible with wilderness values.</li> <li>Conduct onsite investigation of North Farallons at least once during this plan.</li> <li>Conduct annual boat-based survey of seabirds on North Farallons.</li> <li>Review and update the Farallon Wilderness Plan within five years.</li> </ul>	Same as Alt. B.	Do not access wilderness areas. Only monitor by boat.
Resource Protection	Limit staff access to the most sensitive parts of the Refuge, including seasonal and	Same as Alt. A, but:     Coordinate with other agencies for joint law enforcement to prevent boat and aircraft	Same as Alt. B	Close North Landing, portion of Lighthouse Hill, and additional areas to human

Issue Area	Alternative A	Alternative B	Alternative C	Alternative D
	No Action (Current Management)	Expand resource management, research, and public education and outreach (preferred alternative)	Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities	Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach
	permanent closures.  Monitor and enforce prohibition on landing on the Refuge; when possible, contact boats when they enter boat closure areas or disturb wildlife.  Continue to monitor, report and, when possible, prosecute overflight and boat wildlife disturbances.  Monitor and maintain a database of oiled wildlife; report numbers and incidents to Oil Spill Prevent and Response Team.  Monitor the occurrence of oiled seabirds on and around the Refuge and report numbers to OSPR.  Use baseline data and continue population estimates of Farallon seabirds and other wildlife to evaluate impacts of catastrophic and chronic spills.  Coordinate with OSPR and Trustee Agencies to develop restoration and mitigation projects that restore resources lost in oil spills.  Monitor occurrence of dead or injured wildlife.	disturbance.  Coordinate with other agencies to deploy buoys to mark boundaries of state Special Closures in waters surrounding Refuge and provide input to CDFG. Evaluate the need to expand closure areas.  Work with the Federal Aviation Administration (FAA), USCG, and NOAA to identify Refuge areas on aeronautical and navigation charts and develop "notice to pilots" to expand outreach to reduce wildlife disturbance.  Coordinate with USCG and GFNMS to develop an outreach program to commercial and recreational boaters and pilots to reduce wildlife disturbance.  Review plans for existing and emerging fisheries through NMFS and CDFG to identify potential impacts to Refuge wildlife.  Train staff that work on the Refuge how to identify, respond to, and report oil spills. Attend spill responder course given by CDFG's Oil Spill Prevention and Response network (OSPR), Coast Guard, EPA, and NOAA.  Implement strategies developed through NOAA's Sanctuary Vessel Spill Plan and other plans to reduce oil pollution.  Coordinate with relevant agencies to assess and address impacts of drummed hazardous and radioactive waste near the Refuge.  Continue to monitor for presence of oil or other chemicals through soil, egg, and feather sampling.		access during seabird nesting season when feasible to reduce disturbance; monitoring and research activities will be reduced.
Climate Change	No action.	Work with Service experts to conduct climate change analyses (or other appropriate modeling tools) to estimate habitat changes for Refuge.  Partner with GFNMS and others to develop a climate change or vulnerability assessment of	Same as Alt. B	Same as Alt. B

Issue Area	Alternative A	Alternative B	Alternative C	Alternative D
ISSUE AICA	No Action (Current Management)	Expand resource management, research, and public education and outreach ( <i>preferred alternative</i> )	Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities	Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach
		<ul> <li>the Refuge and its surroundings.</li> <li>Assess ongoing and planned management projects in light of modeling results.</li> <li>Develop research and monitoring strategies in partnership with GFNMS and others as part of the Ocean Climate Initiative Action Plan.</li> <li>Partner on a demonstration project to implement interagency, natural resource adaptive management strategies.</li> </ul>		
Wildlife Viewing and Photography	Wildlife-viewing boat tours off- Refuge; no access to the Refuge.	<ul> <li>Same as Alt. A; but:</li> <li>Develop and initiate a naturalist workshop for Farallon area charter boat operators and interpreters. As time allows, interface with tours through radio communication with island staff.</li> </ul>	<ul> <li>Same as Alt. B, but:</li> <li>Develop a visitor services plan that evaluates wildlife observation, photography, and volunteer opportunities (e.g., tours) on SEFI.</li> </ul>	Same as Alt. B
Environmental Education and Public Outreach	<ul> <li>Provide limited interpretive information at visitor centers, website, and school program on coastal wildlife.</li> <li>Implement marine resource education program for selected schools.</li> <li>Allow up to 3 media visits (of 1-3 persons) per year under SUP.</li> </ul>	<ul> <li>Same as Alt. A, but:</li> <li>Coordinate with PRBO and other agencies to expand public outreach activities through docent and interpretive specialist training.</li> <li>Update Refuge brochures and materials directed towards docents and interpretive specialists.</li> <li>Update website with recent observations and information.</li> <li>Install a live web camera for public viewing and education activities.</li> <li>Expand school program on marine environmental education.</li> <li>Utilize cultural resource assessment to develop an interpretive program for outreach events.</li> <li>Develop traveling interpretive displays and educational materials about the cultural resources of the Farallons.</li> <li>Hire a seasonal environmental education specialist to develop a public outreach program that promotes environmental education and outreach to use at fairs, public events, organization newsletters, and boating organizations.</li> </ul>	• Same as Alt. B.	• Same as Alt. B.

Issue Area	Alternative A  No Action (Current Management)	Alternative B Expand resource management, research, and public education and outreach (preferred alternative)	Alternative C Expand Resource Management, Increase Public Education and Outreach, and Develop a Visitor Services Plan that Evaluates On- Site Wildlife-Dependent Recreation Opportunities	Alternative D Reduce human presence through closures of certain areas to monitoring and management activities; increase public education and outreach
Hunting and Fishing	No hunting; fishing in waters off-Refuge permitted (regulated by CDFG).	Same as Alt. A	Same as Alt. A	Same as Alt. A
Boating	Boating allowed; no landing on the Refuge; must comply with state and federal regulations.	Same as Alt. A	Same as Alt. A	Same as Alt. A
Access	None except staff, permitted researchers, supervised volunteers, maintenance or construction contractors, and media by SUP.	<ul> <li>Evaluate and develop public activities including group media tours, boat tours, virtual on-site access through telepresence, blogs, and "Smart" NOAA buoys.</li> <li>Develop interactive telepresence with island staff.</li> <li>Improve outreach on volunteer opportunities to fulfill management and conservation needs.</li> </ul>	Develop a visitor services plan that evaluates options for public access (e.g., tours) to SEFI.	Same as Alt. B.
Cultural Resources	Assessments of infrastructure on a case-by-case basis.	<ul> <li>Work with Service cultural resource specialists to define, map, and record specific historic structures that contribute to SEFI's listing in National Register of Historic Places.</li> <li>Prioritize list of non-historic artificial structures/objects to be removed.</li> <li>Assess potential for cultural resources on North Farallons.</li> <li>Train new island personnel and interns on protecting and preserving cultural resources.</li> </ul>	Same as Alt. B.	Same as Alt. B.

# Chapter 3. Affected Environment

This chapter is intended to describe the physical resources, biological resources, cultural resources, and social and economic environment that would most likely be affected by the alternatives. Chapter 3, *Refuge and Resource Description*, of the CCP provides a detailed description of each of these components. Specific resources and activities, including agriculture and local economy, are not addressed because they are not considered relevant, do not exist on the Refuge, or are not expected to be affected by the management alternatives.

# Chapter 4. Environmental Consequences

This chapter of the EA provides an analysis of the significance of the potential impacts for each alternative based on the physical, biological, cultural, social and economic resources of the local environment. Impacts will be focused on SEFI because most of the proposed activities take place on that part of the Refuge. Direct, indirect, and cumulative impacts are described for each alternative. Alternative A (no action) is a continuation of management practices that are currently in place and serves as a baseline against which Alternatives B, C, and D are compared.

In describing the significant of impacts, the Service defers to NEPA Implementing Regulations at 40 CFR 1508.27. Significantly as used in NEPA requires considerations of both context and intensity of an action. With regard to context, the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant. With regard to intensity, significance refers to the severity of impact.

NEPA requires the development of mitigation measures when federal activities are likely to result in adverse impacts on the human environment. None of the activities proposed under the three action alternatives are intended or expected to result in adverse environmental impacts that would require mitigation measures. However, the CCP contains measures that would prevent the occurrence of any significant environmental impacts.

#### **Physical Resources**

#### Hydrology

The harsh marine conditions are slowly altering the landscape of the Refuge. None of the alternatives will prevent these natural erosion effects on the Refuge. Because of the slow timescale of natural erosion, mitigation for these threats was not developed in the CCP, but effects should be monitored and actions will be reevaluated when the CCP is revised, if appropriate. None of the alternatives will accelerate erosion.

A catchment pad was constructed on SEFI in 1905 to collect rainwater. This water is used by staff on the Refuge for residential needs and not for wildlife or vegetation purposes. No changes are proposed to this system under any of the alternatives, and therefore are not expected to alter

#### the hydrology of SEFI.

Under Alternative A, current management activities are focused on SEFI and do not substantially alter the hydrology of the Refuge. Current vegetation removal is not intensive and does not change the hydrology. Under Alternatives B, C, and D, plant restoration would primarily focus on removing two invasive species on SEFI: New Zealand spinach and cheeseweed; a secondary priority would be removing nonnative grasses and plantain. This removal might modify the short-term hydrologic flow on a very small scale, but would not be likely to result in long-term hydrologic changes. Restoration activities would be conducted intermittently during the seabird non-breeding season (mid-August through late March) by small groups of people using manual herbicide applications and hand pulling to limit disturbance to soil and nesting habitat. Native plants would be reseeded wherever large areas of invasive weeds are cleared to promote revegetation of desirable species and to prevent erosion. Large-scale erosion is not expected because the Refuge is primarily granitic rock with low erosion potential. The Service would not water seeds but would rely instead on natural rainfall. No other activities under the alternatives would be expected to require water sources that might affect hydrology. Therefore, we have concluded that none of the alternatives are expected to adversely affect hydrological patterns.

#### Water Quality and Contaminants

The waters surrounding the Refuge have been designated by the State of California as the "Farallon Islands Area of Special Biological Significance". Discharges into waters with such a designation are prohibited, unless authorized by the State Water Resources Control Board through a permitting process. An on-site survey of SEFI by State Water Resources Control Board personnel in 2003 identified several potential sources of discharge which included six discharge points and two springs/seeps (uncontaminated) (State Water Resources Control Board 2003). The most serious discharge was untreated sewage from the houses. This discharge was eliminated by a septic system installed in 2005. Other potential sources of discharge are concrete slabs that are either water catchments or former building foundations located on upland areas. Water falling on catchment pads is channeled into a storage cistern. Water falling on former building foundations is absorbed into adjacent soil and does not reach the ocean. Therefore, current refuge operations result in no discharge to state waters and therefore have no affect on water quality.

Under all alternatives, nonnative vegetation would be controlled by Refuge staff through a combination of manual and chemical means. However, removal would occur at a higher magnitude in Alternative B, C and D. Under Alternative A, chemical application would be used on a limited basis in invasive plant removal activities. Under Alternative B, C and D, more herbicide is likely to be used on more plants, but applied with the same methods as Alternative A. It is not anticipated that any of the alternatives would adversely affect water quality off the California coast. Herbicides would only be applied directly to target vegetation by handheld sprayer in accordance with label instructions. Only approved pesticides will be used according to label directions, and non-aquatic herbicides will be applied a sufficient distance (usually 100 feet) from water. Glyphosate-based herbicides (4 percent solution) are the most commonly used, although grass-specific herbicides (sethoxydim, 18 percent solution) are used in winter and spring to minimize damage to native plants.

Glyphosate has been approved for use by the U.S. EPA in estuarine environments. Glyphosate is water-soluble and may be transported by surface waters. It is stable in water and sunlight, but is

degraded rapidly by bacteria. It is considered moderately persistent in soils with an estimated half-life of 47 days. Because glyphosate adheres strongly to particles, it does not readily leach to water (Sprankle et al., 1975 cited in Albertson, 1998). There could be adverse impacts on nontarget vegetation from pesticide drift, but these effects are expected to be minimal because herbicides are used in the fall when native plants are dormant, and herbicides would not be applied during inclement weather or high winds (greater than 10 miles per hour). Herbicides are used in the upland areas of the Refuge and not in the intertidal zone, which makes runoff to the ocean unlikely. The use of herbicides is highly regulated through the Service's annual Pesticide Use Proposal (PUP) process. This approach notes environmental hazards, efficacy and costs. All herbicides used by the Service are stored in approved spill-resistant and locked pesticide storage containers. Only a one-year supply will be stored on the Refuge, not more than ten gallons.

Sethoxydim (Poast) photo degrades in water in less than one hour (EXTONET 1996). However, sethoxydim is moderately to slightly toxic to aquatic species. It will not be applied in intertidal areas of the Refuge and areas where surface water is present. Furthermore, application of this herbicide will not occur during inclement weather or high winds to reduce drift into the ocean. Like glyphosate, this herbicide is highly regulated through the Service's annual PUP process. Only a one-year supply will be stored on the Refuge of not more than ten gallons.

Rodenticide would not be used under Alternative A. The proposed use of rodenticide in Alternatives B, C, and D is not expected to significantly impact the marine environment or the Refuge water supply. The application methods for the rodenticide have not been determined. The methods will be analyzed in a subsequent environmental document. Procedures and/or technology will be developed to prevent rodenticide from being dispersed into the ocean. The brodifacoum-based rodenticide pellets proposed to be used are composed of compressed grain, similar to breakfast cereal. The pellets are highly water-soluble and in the unlikely event that the pellets enter the water, they would rapidly disintegrate to undetectable levels. Brodifacoum-based rodenticide pellets have been used on Anacapa Island in southern California, no brodifacoum residues were detected in the marine water samples collected after bait application (Howald et al. 2005).

The risk of rodenticides entering and contaminating the human water supply on the Refuge is very low. Bait application actions would include the following mitigation to avoid the entry of any bait pellets into the water supply and water catchment areas. Rodenticide would not be applied to the water catchment areas or water supply tanks. The water supply would also be monitored for brodifacoum levels after bait application.

Transportation methods could have impacts to the marine environment. Traveling to the Refuge is complicated and often unpredictable due to changing weather conditions. The Service does not have a boat suitable for transporting staff and supplies to the Refuge. Instead, it relies on volunteer captains and their boats for transport, and occasionally charter boats. Travel to and from the Refuge is currently conducted by sailboats and, less often, motor boats. These vessels are generally of small capacity, carrying only a small group of people, and do not visit the Refuge on a daily basis; most typically they arrive once every two weeks, tie up to a mooring buoy for two to four hours, drop off and receive supplies and staff, and then depart. This limits the risk of direct impacts on the local environment. Under all alternatives, reliance on volunteers and their boats would continue. The use of gas-powered vessels would have the potential to introduce various contaminants, including fuel oils, grease and other petroleum products, to the surface

waters. Because the use of gas-powered vessels is infrequent and the boats carry small amounts of fuel (less than ten gallons), the risk of petroleum contamination is minimal.

Under Alternative B, C, and D, additional research activities could increase vessel traffic and impact water quality. Under Alternative C, any on-site public opportunities developed under the visitor services plan could result in slightly increased vessel traffic and incidental impacts on water quality. It is likely that additional boats would be needed for any activities on the Refuge, separate from staff- and supply-related transportation. This is not likely to be significant because the Refuge can only support a limited number of people at one time. Additionally, these boats would be required to follow the same protocols as supply-related transportation in properly maintaining the vessels to reduce impacts to water quality (i.e., no ballast dumping near the Refuge, maintaining engines properly to reduce release of contaminants into the waters off the Refuge). Activities are not likely to be conducted on a daily or high volume basis because weather conditions, wildlife sensitivity, and management activities would limit visitation. Public uses could increase the potential for trash to enter the local environment. However, visitor protocol would need to be developed in order to reduce impact on the Refuge environment.

Overall, impacts to water quality from any of the alternatives are expected to be minimal.

#### Geology and Soils

The Refuge is primarily made up of granitic rock with very little exposed soil. Consequently, soil erosion is naturally limited. Likewise, plant communities are limited in both variety and extent. The strong to moderate winds that characterize the San Francisco coast naturally erode rock and soil at the Refuge. Erosion is also expected to result from rising temperature and sea level associated with climate change (Malcolm and Pitelka 2000).

Soil erosion is not anticipated to result from the nominal on-site activities occurring under Alternative A (no action). Restoration activities under alternatives B, C, and D may result in minimal soil erosion. Expanded removal of nonnative vegetation would expose soil, potentially increasing short-term erosion. Herbicides could potentially persist in the soils. Glyphosate herbicide tends to strongly adsorb to organic matter and fine sediments but is physiologically inactive. The reported rate of glyphosate decomposition and persistence in soil varies a great deal: most studies suggest rapid decomposition, while others detect persistence in the soil for more than a year (Ebasco 1993). Conversely, sethoxydim has low soil persistence. Reported field half-lives range from 5-25 days and sethoxydim has a weak tendency to adsorb to soil particles (EXTOXNET 1996). Disappearance of sethoxydim is primarily due to action by soil microbes. Long-term effects of herbicide in the soil and geology are not expected to be significant.

Plant removal areas are in the interior of SEFI and are not likely to result in runoff into the ocean. Furthermore, establishment of native plant communities will likely mitigate any soil erosion resulting from invasive plant removal. Removal of derelict infrastructure under Alternatives B, C, and D would also expose bare soil; however, these areas will either be seeded with native plants or replaced by habitat structures.

The use of brodifacoum-based rodenticide in Alternative B, C, and D is not expected to significantly impact soil. Cereal-based bait pellets would be used to eradicate mice that have been designed to degrade rapidly in moist environments such as the Farallons. The bait product contains an extremely low concentration of brodifacoum (between 20 and 50 part per million, or

between 0.002 and 0.005 percent) that is highly unlikely to result in a measurable level if leached into the environment (Sheppard, pers. comm.). Brodifacoum in soil can persist in soil with half-life from 28-178 days (USEPA 1998)). On Anacapa Island, brodifacoum was used to effectively eradicate rodents. No brodifacoum residues were found in soil samples collected after bait application, with the exception of one sample that contained only trace levels (Howald et al. 2005). This sample was likely taken from a point in the immediate vicinity of a disintegrated bait pellet.

Soil erosion from volunteers, visitors, and staff are expected to be minimal. People are expected to stay on established trails and boardwalks unless supervised by staff familiar with the soil conditions in non-trail areas.

In summary, the alternatives would have only minimal effects on geology and soils. Soil erosion would be limited by establishing native plants where invasives or derelict infrastructure is removed. Soil contamination would be limited by using herbicides and rodenticide that degrade rapidly.

#### Air Quality

Under Alternative A (no action), only negligible air quality impacts are expected. Existing impacts on air quality are mainly associated with low level use of a diesel generator that powers the East Landing derrick and provides supplemental power for buildings. Other impacts to air quality are incidental to transportation; weekly or biweekly staff and supply trips currently cause short-term increases in air emissions when power boats are used. The Service has not engaged in any other activities that would permanently affect the surrounding air quality. Removal of infrastructure under Alternatives B, C, and D may temporarily create short-term increases in airborne particulate matter. Herbicide application in all the alternatives is not likely to affect air quality. Herbicide would be applied by hand-spraying in close contact to the plant which would reduce or eliminate drift. Also, spraying would not occur during inclement weather or high winds to avoid the possibility of chemical drift. The rodenticide proposed for use is not expected to cause any air quality impacts because pellets are not easily airborne.

Any public access opportunities developed in the visitor services plan under Alternative C would result in minor short-term increases in vehicle exhaust emissions given transportation requirements to access the Refuge. The number of people and trips to the Refuge would be limited because of the small size of SEFI and the sensitivity of wildlife to human disturbance.

# Hazardous Materials and Safety Issues

The storage of petroleum-based chemicals is one of the main hazardous materials on the Refuge. All are stored in approved containers, which include secondary containment. The Refuge has a current spill contingency and response plan, which guides handling and storage of petroleum products.

A soil sample revealed the presence of hydrocarbons very close to the powerhouse, potentially resulting from waste oil and diesel containers stored on SEFI (GeoEngineers 2006). While no cleanup standards are available for the Refuge's environment, clean-up was largely conducted through passive remediation. Waste oil and diesel were removed and a bio-venting system installed to reduce hydrocarbon concentrations in the problem areas as part of a hazardous materials cleanup project in 2002. Other potential soil remediation, including potential soil removal is pending planned contaminants analyses of seabird feathers, salvaged eggs and dead

chicks.

Under all the alternatives, herbicides will only be stored and used on SEFI. These herbicides are not expected to result in any long-term adverse impacts to the local environment. Storage would not pose any safety or hazardous material dangers because only a one-year supply will be stored on the Refuge, not more than 20 gallons (not more than ten gallons of sethoxydim and glyphosate, each). The herbicides will be stored in an approved spill-proof locker, according to label directions, California regulations, and Service policy. Crews applying the herbicide will be trained in storage and application to these same standards. In the long-term, the use of herbicides is expected to decrease. Historical (pre-1998) herbicide treatment was inconsistent, with spraying sometimes occurring after seeds were dispersed, resulting in a seed bank in the soil. Current and future herbicide application will be conducted prior to seed dispersal each year which will reduce the seed bank and over time reduce the amount of herbicide required.

Under Alternative B, C, and D, a brodifacoum-based rodenticide would be used for mouse eradication but would not be stored on the Refuge over the long-term. It is expected that all bait application activities would be contained within a time period of less than 30 days. This rodenticide would only be stored on the Refuge during this period. Its application would be highly supervised, according to label directions, California regulations, and Service policy. Therefore, no safety or hazardous materials issues are anticipated.

The natural and artificial landscapes of the entire Refuge pose safety concerns for staff and visitors. All four groups of islands that make up the Refuge are extremely difficult to access because they are rocky and affected by tide conditions (beach landings are not possible). Only SEFI has a landing boom to transfer people and equipment from the boat onto the Island. Alternatively, SEFI has a secondary entry point which is a metal grate platform only accessible in calm conditions. Even with this equipment, weather conditions can change quickly and equipment can fail, making transfers risky. Safety concerns for staff and volunteers are largely the same under each alternative. Under all of the alternatives, staff and volunteers would receive safety instruction prior to visiting the islands to minimize the chance of injury.

Under Alternatives B and D the Refuge would remain closed to the general public thereby reducing safety risks to visitors. However, volunteers, staff, and researchers continue to encounter safety risks when visiting SEFI. Under Alternative C, any public access opportunities developed under the visitor services plan for the Refuge could pose some safety risks in the transport of visitors on and off the Refuge. Safety consideration would need to be thoroughly addressed when activities would be further evaluated. Protocols would need to be developed to reduce the risks. Even with these measures in place, minor to moderate risks to visitors would remain.

Guided media visits (no more than one to three persons at a time) would be permitted by request under each of the alternatives. An annual group media visit would be organized by the Service under Alternative B, C, and D. Visits by non-staff who are unfamiliar with the refuge conditions could present some safety issues. As described above for visitation under Alternative C, media representatives would be instructed on how to make the transfer safely and protocols would be put in place to ensure that transfers are not made during unfavorable weather conditions.

#### Wilderness

Under Alternative A, access to wilderness areas would be prohibited except for management, limited research and monitoring at West End. Alternative A does not specify limits on the number of visits allotted for monitoring and research. Under Alternative B and C, wilderness would be afforded greater protection than Alternative A because access would be restricted to six visits between September and October to assess the expanding fur seal colony, and six visits between January and February to monitor elephant seals. Under Alternatives B and C, nonnative vegetation will be removed and native plant restoration activities will take place on West End. These activities will not occur during the breeding season, thus avoiding impacts to sensitive wildlife. Visits to West End for restoration activities will not likely exceed two visits per year. However, the wilderness aesthetic may be temporarily disturbed by herbicide spraying, pulling of nonnative vegetation, and seeding. No mechanized equipment will be used in the wilderness areas. However, boats may be required to reach wilderness areas. In the long-term, this plant restoration will have a beneficial effect of restoring the historic wilderness value of West End. Alternative D would provide the greatest protection to wilderness resources because no access would be allowed on West End. However, nonnative vegetation may spread without control methods.

House mice are present on West End, which is designated as wilderness and closed to public access. Alternatives B, C and D include a program to eradicate mice on SFI. Under these alternatives, brodifacoum-based rodenticide would be dispersed onto West End when seabirds and pinnipeds are not breeding in the area. The exact method of application will be determined in a subsequent environmental document assessing different options. The use of rodenticide will have short-term human disturbance of the West End and its wilderness features. Individuals will be flushed from the area, but these disturbances are not expected to adversely affect wildlife populations. Wildlife will be able to return to habitat once application has been completed. In the long-term, eradication of mice from this wilderness area is expected to improve the wilderness character of West End by removing a human-introduced species and restoring the area for seabirds relying on this area for breeding. The impacts of this activity on wilderness will be further evaluated in a separate environmental document for the mouse eradication plan. In addition, a Minimum Requirements Decision process will be conducted to assess any machinery used in wilderness areas on the Refuge.

#### **Biological Resources**

#### Terrestrial Vegetation

No federally listed plants occur on the Refuge. Maritime goldfield, an annual endemic to offshore seabird nesting islands in California and Oregon, is the most abundant native plant on SEFI. Nonnative species such as cheeseweed, New Zealand spinach, and grasses can outcompete with the maritime goldfields. Under each of the alternatives, nonnative vegetation will be removed from SEFI by manual and chemical methods. These activities would occur at a reduced rate under Alternative A (no action) compared to Alternatives B, C, and D. Nonnative vegetation will be individually hand-pulled, which will reduce the possibility of accidentally removing native vegetation.

The application of herbicides will be properly calibrated to needs. Use of herbicides would result in reduced nonnative vegetation and allow for expansion of native plant communities. Glyphosate is a broad-spectrum herbicide, toxic to nonnative and native plants. Sethoxydim is toxic only to

grasses and is not expected to affect any native grasses which are very sparse and not located in areas where nonnative grasses would be sprayed. When applied broadly across large areas, the alternatives in the plan incorporate protocols to minimize adverse effects. Application of herbicides will be conducted by hand to individual plants, reducing probability of impacting native plants. Moreover, herbicides will only be used when native plants are not in their growing season (nonnative plants on the Refuge grow actively in the late summer while native plants actively grow in the spring). The removal areas would be seeded with maritime goldfields to facilitate expansion of native plant communities, which would also be suitable for seabird nesting habitat. Refuge staff would use different planting techniques in experimental plots and compare results with control plots to determine how best to encourage the growth of native plant communities. Alternatives B, C, and D would revise the current vegetation management plan with the goal of removing 50 percent of invasive New Zealand spinach and cheeseweed in ten years and 95 percent over the long-term through hand and chemical means. Additional vegetation management would include monitoring removal and planting technique efficacy over time, employing GIS and other mapping technology.

The brodifacoum-based rodenticide proposed for use in Alternatives B, C and D has no known toxic effects to vegetation.

Under Alternative C, any public access opportunities developed in the visitor services plan would likely increase foot traffic on the Refuge and might introduce nonnative vegetation (from footwear, clothing), increase soil compaction, or trample of native vegetation. Designated foot trails and close supervision would need to be included in any of the potential wildlife-viewing activities evaluated under this alternative in order to reduce impacts to native vegetation. Protocols and monitoring would also need to be implemented to reduce the likelihood of introduction. Impacts to vegetation would need to be evaluated further in the visitor services plan. Under Alternative D, closure of certain trails during the nesting season might promote the growth and expansion of native plant communities with the reduction of human access.

Under all alternatives, the abundance of native vegetation is expected to expand on the Refuge. Habitat restoration fulfills the Service's congressional mandate to preserve, restore, and enhance habitat for threatened and endangered species, songbirds, waterfowl, other migratory birds, interjurisdictional fish, marine mammals, resident wildlife, and plants. Overall, plant restoration activities under Alternatives B, C, and D are expected to increase the Refuge's native habitat in comparison to Alternative A (no action). In summary, only minor impacts are expected from the removal of invasives and other management activities. Long-term beneficial effects would outweigh the impacts of the short-term activities.

#### Wildlife

Seabirds and pinnipeds would continue to be the focal points of refuge management under all alternatives. Monitoring during the nesting and pupping seasons is crucial to determining the health of seabird and pinniped populations. Moreover, long-term data from these top marine predators can be used as an indicator of changes in the marine environment. Populations and breeding success can fluctuate drastically based on ocean conditions.

Under Alternative A (no action), no major disturbances are expected that would negatively impact wildlife population levels. The Service and research staff would continue to monitor and research seabird and pinniped populations. Protocols in place would continue to minimize disturbance

caused by foot traffic. Refuge management activities requires the use of boats and occasionally helicopters which could cause temporary wildlife disturbance. Boating and aircraft restrictions would continue to be in place to reduce disturbance, especially during sensitive breeding periods. These management activities are not expected to have a population-level effect on wildlife. Staff currently provides protection for wildlife by discouraging and recording aircraft or boating disturbance.

However, challenges including predation of ashy storm-petrels (by mice, owls, and gulls) and expansion of non-native vegetation would continue to persist. The current footprint of nonnative vegetation would remain stable or slightly decrease and density of mat-forming plants (e.g., New Zealand spinach, cheeseweed) would decrease. Therefore, habitat for burrow-nesting auklets would improve. Use of herbicides (glyphosate and sethoxydim) and hand-pulling to remove nonnative plants has the potential to impact biological organisms. Short-term impacts of plant removal are likely to include disturbance of roosting (non-breeding) wildlife within close proximity to the field crews conducting the removal. Such disturbance may cause wildlife to relocate to other parts of the Refuge temporarily (less than one day). These effects are minor because once the crews depart, the wildlife would likely return. Herbicide spraying would occur during a one-to two-week period per year and would not be conducted during the seabird or pinniped breeding seasons to reduce exposure to wildlife.

It is unlikely that terrestrial wildlife will be exposed to herbicides because each plant is individually sprayed by hand and the chemical dries in less than an hour, becoming inactive when dry. Laboratory tests of glyphosate generally indicate it to be nontoxic or low in toxicity to mammals and birds, particularly at the concentrations or doses that occur in field conditions, according to Extension Toxicology Network (EXTOXNET² 1996). Most information about glyphosate toxicity to animals comes from experiments on rats, mice and rabbits, and some on dogs. Little information is available on glyphosate toxicity or its breakdown products on most wildlife species. Toxic effects of glyphosate are usually achieved in laboratory animals at very high doses (hundreds or many thousands of times the exposure expected from concentrations and doses applied in field conditions) comparable to portions of animal diets, are often required to generate acute effects (Ebasco 1993, Giesy 2000). Glyphosate's toxicity is categorized as Caution, according to the U.S. EPA. Caution means the product in slightly toxic if eaten, absorbed through the skin, or inhaled, or it causes slight eye or skin irritation. It is the least toxic of the four categories (Caution, Warning, Danger, and Danger-Poison).

Glyphosate to be used on the Refuge is a much lower concentration than that used in lab conditions. Aquatic wildlife is not anticipated to be impacted by glyphosate because the application will be conducted upland, away from intertidal areas making it unlikely that fish and marine invertebrates will be affected. Based on this information and the timing of herbicide application, it is unlikely that wildlife on the Refuge will be significantly impacted.

Sethoxydim is practically nontoxic to birds and has low toxicity to wildlife (EXTOXNET 1996). It has been shown to be moderately to slightly toxic to aquatic species, but not to bees. Sethoxydim is also categorized as Caution with regard to its toxicity. Significant wildlife impacts are not

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<sup>&</sup>lt;sup>2</sup> EXTOXNET is an independent collaborative information project about pesticide, established by the Cooperative Extension Offices of Cornell University, Oregon State University, the University of Idaho, the University of California, Davis, and the institute for Environmental Toxicology, Michigan State University.

expected from herbicide application. Like glyphosate, sethoxydim will be applied by hand directly to grass patches making it unlikely that wildlife would receive direct exposure. Grasses primarily occur in the upland parts of the Refuge away from the intertidal zone, making it unlikely that aquatic species would be exposed to sethoxydim.

Requested media visits existing under this alternative may result in disturbance to non-breeding wildlife. To reduce any potential for disturbance, media personnel will be supervised at all times when on the Refuge and limited to a maximum of three visits per year with no more than one to three media representatives per visit.

Alternative B would include those activities in Alternative A, but also provide more protections from disturbance. The Service would work with relevant partners, such as USCG and GFNMS, to coordinate enforcement. The Service would also develop educational materials and programs in coordination with partners such as GFNMS and PRBO to educate boaters and pilots about the sensitive nature of wildlife on the Refuge. The Service would also participate in fisheries plans (e.g., those developed by NMFS) to reduce fisheries-seabird interaction.

Wildlife research would be expanded under Alternative B, which could increase our understanding of breeding species' off-refuge foraging needs or mortality factors. Expanded research may result in an increase in disturbance levels greater than Alternative A, but is not expected to have a population-level affect on any species. The same wildlife protocols and standards for research under Alternative A will be applied to new research studies in Alternative B. The number of personnel on the island at any one time will continue to be limited. This new research could ultimately lead to better protection of breeding species both on and off the refuge (e.g., through input into fisheries management plans). Alternative B would also increase our understanding and management of other species that use the Refuge such as salamanders, bats, and insects.

Wildlife would benefit from the habitat changes prescribed under Alternative B. The removal of excess infrastructure would open additional habitat for wildlife and reduce hazards. The reuse of infrastructure materials would provide additional nesting habitat for crevice-nesting species. The removal of excess infrastructure would not occur during the breeding season in order to limit wildlife disturbance. Accelerated removal of nonnative plants and native planting under Alternative B would provide additional habitat and nesting material for cormorants and western gulls. Affects of vegetation removal to wildlife would be similar to that described in Alternative A and are not expected to be significant.

Alternative B, C, and D propose the eradication of non-native house mice and the lethal removal of up to ten western gulls per year. Individual gulls that are identified as storm-petrel predators would be trapped and humanely euthanized under an experimental program. This pilot program would be monitored to determine the efficacy of removing individual specialist gulls. This taking of problem gulls would be reviewed under a Migratory Bird Treaty Act permit. While western gulls are listed as migratory birds, this take is not expected to affect their population level. Moreover, it is expected to reduce predation pressure on the ashy storm-petrel population, which is currently a candidate for ESA-listing. Minimal, but positive effects to mainland burrowing owl populations are expected. Migratory burrowing owls that land on SEFI in the fall will move off the island after a few days to more suitable wintering areas on the mainland. Many burrowing owls that currently over-winter on SEFI (enticed to stay by nonnative mice) perish from starvation or are killed by gulls.

Under alternative B, C, and D, brodifacoum-based rodenticide, considered the most effective method for eradicating mice, would be used. Much of SFI is suitable for mouse habitat, including many sheer cliffs and ledges that are difficult to access by foot. This rodenticide has been effectively used on over 300 islands worldwide to effectively eradicate rodents (Island Conservation Group, unpub. data). This eradication is expected to lead to an increase in ashy storm-petrel numbers, which have been in decline for several years. Recent documentation revealed that burrowing owls have been predating on mice and subsequently, storm-petrels, when the mice population declines each year. Eliminating mice is expected to discourage burrowing owls from overwintering on the Refuge and preying upon the storm-petrels. Over the long-term, seabirds are expected to benefit from mouse eradication because of the elimination of this predator. In the short-term, very small numbers of songbirds migrating through the Refuge may attempt to feed on the pellets and may be fatally poisoned.

This environmental document only identifies some general consequences. It is important to note that further analyses will be conducted in a subsequent project-specific environmental document for the mouse eradication prior to implementation in order to fully identify the best method and timing for deploying the rodenticide.

Overall, seabirds and songbirds are not expected to be at significant risk from the rodenticide. Most seabirds are exclusively marine predators and are not expected to feed while on land. However, western gulls have the potential to ingest bait pellets or poisoned mice though impacts are not expected to significantly affect their population level. Most songbirds present on the Farallons are vagrant landbird individuals, on the Refuge during spring and fall migration. The application of rodenticide will take place in the late fall, when there are very few songbirds or seabirds on the Refuge. Incidental mortality among individual songbirds may occur, but is not expected to have a population-level effect to a songbird species because songbirds species do not migrate to the Refuge is large numbers. Individual songbirds that eat grains may attempt to eat the bait. Bait pellets likely would be dyed green, which has been found to discourage birds from swallowing the pellets. Unconsumed bait pellets could last for a period of between one week and six months after the initial application.

Brown pelicans use the Refuge greatest from September through November. Pelicans may be roosting on the island during the rodenticide application and may be temporarily flushed. There would be no direct effect of the rodenticide on the pelicans since they are piscivorous (fish eating). The application would not have an adverse impact on the roosting or breeding population size of brown pelicans. Pelicans on East Anacapa Island in 2001 were not adversely affected by rodenticide application.

Pinnipeds on the Refuge are not expected to be harmed by the rodenticide used in Alternative B, C and D. While the rodenticide is toxic to vertebrates, even the smallest pinniped would have to consume hundreds of bait pellets to experience any toxic effect. Furthermore, pinnipeds are exclusively piscivorous and would not to be interested in ingesting bait pellets.

Broadcast of rodenticide pellets and associated human activity is also not expected to have long-term disturbance to sensitive wildlife. Rodenticide application may have short term effects that would occur for a few hours. These may include minor wildlife disturbances due to personnel on foot, conducting activities such as post-application monitoring. Personnel activity would be similar

to ongoing Refuge maintenance activities that are currently conducted year-round on the islands. Resting birds or pinnipeds may flush or disperse temporarily as a result of personnel presence. However, the application of rodenticide would occur some time from September through late-December when none of the species on the Refuge is breeding in order to reduce impacts. Furthermore, SFI would be treated in distinct segments, providing alternative habitat for wildlife to roost or haul out throughout the bait application.

The rodenticide proposed for use is also not expected to have toxic effects on reptiles, amphibians, or insects (Hoare and Hare 2006). Careful monitoring on Anacapa Island during their broadcast of rodenticide found no evidence of negative impacts on native salamanders or reptiles (Howald et al. 2005).

The rodenticide is not expected to have an effect on marine and terrestrial invertebrates because they have different blood clotting systems (Hoare and Hare 2006). Very few fish are attracted to grain-based bait pellets. Studies in New Zealand and California have documented no evidence of fish consuming brodifacoum moving through the marine ecosystem (ICEG 2000).

Mice that have eaten the rodenticide are not expected to significantly impact other animals through secondary poisoning (predators or scavengers eating the mice). Burrowing owls, barn owls, and infrequently-occurring kestrels and saw-whet owls are the only birds of prey on the Farallons that eat mice. Due to the small numbers of birds present on the Farallons, any incidental mortality of birds of prey through consumption of poisoned mice would have no population-level effects. The Service may consider temporarily capturing and holding or relocating some birds of prey (such as burrowing owls) prior to broadcast of rodenticide. Gulls have been known to consume mice, both alive and dead, and there may be incidental mortality of individual gulls as a result of secondary poisoning. However, this mortality is not expected to have any noticeable population-level effects. The rodenticide application would be timed to coincide with the annual low point in gull populations on the Farallons, outside of the breeding season.

Alternative B would include an annual group media organized by refuge staff that may result in temporary disturbance to wildlife. Like the other media visits described in Alternative A, these tours would be supervised by refuge staff and held during less sensitive wildlife periods to reduce impacts to wildlife. This alternative would also include expanded environmental education offered to the public to promote understanding of wildlife and its needs. These activities will take place off-site and are not expected to impact wildlife.

Alternative C could yield more disturbance of wildlife than the other alternatives. The addition of public access opportunities might increase wildlife disturbance, crush seabird nesting burrows, or otherwise damage nesting habitat. These activities will be evaluated further in a visitor services plan to determine their affects to wildlife, especially during the sensitive breeding seasons. Public visitation would likely take place during the non-breeding seasons to reduce wildlife disturbance. Close supervision by staff would be necessary for undertaking these activities.

Alternative D would likely improve wildlife habitat availability more than the other alternatives. In addition, Alternative D would include closure of the Lighthouse Trail and North Landing during the breeding season. These closures would increase breeding and nesting habitat. USCG operations at the lighthouse would be excluded from closures. However, reduced access to monitoring sites would decrease collection of wildlife data.

#### **Cultural Resources**

Refuge management activities have the potential to disturb cultural resources under all the alternatives. To preserve Refuge historic resources, all undertakings, including but not limited to maintenance activities, will be coordinated with the Service's Regional Archaeologist. There are no known accounts of local Native American use of the Farallon Islands. The most evident cultural resources relate to the sealing and egg gathering activities that took place in the nineteenth and twentieth centuries. Any culturally important objects potentially affected by Refuge activities are handled in accordance with federal cultural resource regulations.

SEFI was listed in the National Register of Historic Places in 1977. Most of the buildings and structures on SEFI have been assessed by the Service's Regional Archaeologist under Section 106 of the National Historic Preservation Act. The buildings and structures that qualify as historic properties or contribute to the historic landscape will be maintained according to the Secretary of the Interior's Standards for the Treatment of Historic Properties. Under Alternative A, any renovations, repairs, or modifications to historic properties will strive to maintain their historic character.

Restoration of vegetation and removal of excess infrastructure under any of the alternatives can potentially disturb subsurface cultural resources. Because these activities have the potential to affect cultural resources and to cause soil erosion, they will be carefully monitored. Steps will be taken to preserve significant structures or mitigate potential effects of their removal.

Alternatives B, C, and D specify an outreach and education component that will include a history of the cultural resources on the islands. Environmental education brochures for visitors and local residents will include information on historic structures and artifacts. The existing marine resource school program will be expanded to include this cultural resource component. Under Alternative C, any type of public access could have the potential of damaging or degrading cultural resources on the islands. This will be evaluated further in the visitor services plan, including methods for avoidance, protection, or mitigation.

## Social and Economic Environment

None of the alternatives are expected to have major effects on the social and economic environment of San Francisco County. The Refuge is not adjacent to any communities to which it could provide immediate recreation or economic opportunities. Similarly, the Refuge does not currently provide any direct tourism. Wildlife-viewing tour boats that visit the Refuge vicinity (though they do not land) indirectly contribute tourism revenue to the San Francisco Bay area. However, tourism revenue may be generated through the public access opportunities considered under Alternative C.

#### Recreation

Alternative A (no action) does not provide recreational opportunities on the Refuge. However, fishing and boating has occurred in the area from before the Refuge's establishment into the present, and chartered wildlife-viewing tour boats frequent the Refuge's waters. These activities are regulated by CDFG and not the Refuge. It is expected that this activity would continue under all the alternatives. Under Alternative B, brochures and information about the Farallon Islands wildlife would be created to communicate the Refuge's purpose and history. Emphasis on recreation off-site would be prioritized. For instance, Refuge staff will work with interpretive specialists and docents to improve the visitor experience on charter boat tours, and at museums

and other visitor centers. A live web camera system and website will provide "virtual" wildlife observation. Volunteer opportunities would also provide limited access while conducting management-oriented activities. Alternative C would include the recreational opportunities described for Alternative B; additionally, the Refuge would conduct an analysis of appropriate public access opportunities that could be conducted on the Refuge. Examples of such activities to be considered include wildlife observation and photography through guided tours. These activities would need to be assessed for safety, biological impacts, costs, and infrastructure needs. Alternative D would provide the same recreational opportunities as Alternative B.

### *Employment*

Under all the alternatives, the Refuge is not expected to create a significant number of employment opportunities for the surrounding community. Alternatives B, C, and D would make the Refuge operations specialist a permanent position, and a seasonal environmental education specialist position would be added.

#### **Unavoidable Adverse Impacts**

None of the alternatives considered for the Refuge would be expected to result in unavoidable adverse environmental effects. Refuge staff will monitor any incremental or unforeseen adverse effects on the Refuge and mitigate them accordingly.

#### **Irreversible and Irretrievable Commitments of Resources**

Most management actions identified in this document would require a commitment of funds that would then be unavailable for use on other Service projects. At some point, commitment of funds to these projects would be irreversible; once used, these funds would be irretrievable. Nonrenewable or nonrecyclable resources committed to projects identified in this CCP, such as fuel for chartering boats to the Refuge; supplies used in management or maintenance activities (e.g., herbicide, infrastructure supplies, signage); and materials for enhancement and restoration projects would also represent an irreversible or irretrievable commitment of resources.

Finally, Alternatives B, C, and D would result in the eradication of nonnative mice and euthanizing up to ten gulls per year. This would represent an irreversible and irretrievable loss of wildlife resources, but this activity would result in the overall net benefit of restoring native wildlife resources on the Refuge.

#### Short-Term Uses vs. Long-Term Productivity

An important goal of the Refuge System is to maintain the long-term ecological productivity and integrity of the biological resources on NWRs. This system-wide goal is the foundation for the goals presented in the CCP. Alternatives B and D favor long-term productivity over short-term uses by limiting public and research access, focusing instead on the expansion and protection of wildlife habitat. The resulting long-term productivity would include increased protection and survival of migratory seabird species, pinnipeds, and endemic and rare plants on the Farallon Islands. With the preservation of these plant and animal species, the public would gain long-term opportunities for wildlife-dependent recreational activities. Alternative C will consider on-site public opportunities through a visitor service plan which may affect wildlife habitat damage or introduce nonnative species, but would have the potential to expand public outreach.

#### **Cumulative Effects**

Cumulative effects are those effects on the environment resulting from incremental consequences

of the Service's proposed actions when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes those actions. Cumulative effects can be the result of individually minor impacts that can become significant when added over a period of time. It is difficult to accurately analyze cumulative effects because one action may increase or improve a resource in one area, while other unrelated actions may decrease or degrade that resource in another area. Moreover, CCP actions may be inhibited or accelerated by other activities or management plans occurring in the same area. This section must assess how those other activities, in addition to the CCP actions, would affect the physical, biological, cultural, and social and economic environment.

The Refuge is located so far offshore that only a small number of projects would result in a synergistic effect when added to those activities in the CCP.

#### Cumulative Effects on the Physical Environment

The California State Legislature passed the Marine Life Protection Act in 1999 mandating the State to design and manage an improved network of marine protected areas to, among other things, protect marine life and habitats, marine ecosystems, and marine natural heritage. The process for this initiative is just beginning, but could have a profound beneficial affect on the Refuge and resources adjacent to the Refuge (e.g., foraging conditions for breeding birds). The management plan for GFNMS focuses on enforcement and off-Refuge activities that are not likely to affect the physical appearance of the Refuge. Some beneficial physical changes will occur under the CCP alternatives. Primarily, nonnative vegetation and excess infrastructure will be removed. Excess infrastructure will be reused for bird habitat when possible. No digging or construction of additional structures is planned. The Refuge is rustic, containing very basic infrastructure for limited staff and maintenance equipment. While Alternative C could increase the number of humans on the refuge through a visitor services plan, no buildings would be constructed to accommodate the potential increase in visitors. The restoration proposals described for the Refuge would contribute minimally to the overall cumulative effect of this plan and other projects.

Climate change could have a profound effect on an island refuge such as the Farallon Islands. Anticipated effects of climate change on temperate ocean systems include: sea-level rise; increase land runoff; higher ocean and land temperatures; changes in wind and wave activity; altered ocean chemistry such as ocean acidification; and changes in ocean circulation. Sea-level rise, a consequence of climate change, could reduce the total land area of the Refuge; some parts of the islands could become permanently submerged as the estimated sea-level rise of 0.1–0.2 mm/yr should transpire (IPCC 2001). Over time, this could result in significant ramifications for wildlife and vegetation. Habitat for wildlife at the shore could disappear, forcing wildlife to move onto higher ground, possibly competing with other wildlife for habitat. Plant communities at the shore could be inundated or be forced to migrate to higher ground, competing with other vegetation (Smerling et al. 2005). Changing temperatures could also shift vegetation endemic to an area to new locations (Malcolm and Pitelka 2000). Monitoring protocols prescribed in the CCP could inform the management of refuge habitat and habitat restoration plans.

#### Cumulative Effects on Biological Resources

The wildlife populations on the Refuge currently face ongoing, human-induced threats of oil spills, introduced species (both plant and animal), human disturbance, and fishing impacts. Oil spills and human disturbance may add to the long-term cumulative stressors to wildlife populations on the Refuge. The Refuge is near a major shipping lane and its wildlife resources have been impacted

by oil spill incidents in the past, and most recently by the *Cosco Busan* vessel accident in the San Francisco Bay in November 2007. Oiled birds as a result of this accident were observed on the Farallons. The regular occurrence of oil spills, regardless of magnitude, can add to the cumulative stresses on wildlife that include human disturbance or climate change. Due to its proximity to San Francisco, the Refuge encounters regular non-commercial boat and air traffic. These disturbances over time can contribute to long-term stress to wildlife populations and habitat, especially if their frequency were to increase over time. Flushing wildlife from breeding habitat could affect long-term productivity.

Climate change could additionally magnify impacts on wildlife habitat, reduce native vegetation, and increase occurrence of nonnative (plant and animal) species on the Refuge. Climate change can result in physiological changes, phenological (lifecycle) changes, range shifts, community changes, ecosystem process shifts, and multiple stressor conditions (Parmesan and Galbraith 2004). Global warming may require organisms to migrate at much higher rates than they have done in the recorded past (Malcolm and Pitelka 2000). As oceanic variability will potentially increase due to climate change, short-term phenomena that already affect the island's populations including extreme weather events such as heavy storm surge and heat waves (CCSP 2008) and changes in upwelling patterns, affecting food availability and the timing of lifecycle events (Bakun 1990; Schwing and Mendelssohn 1997; Mendelssohn and Schwing 2002; Snyder et al. 2003; and Barth et al. 2007), can become more pronounced and occur with more frequency. Native plants could be eliminated from the Refuge by changing temperatures, which could affect the nesting material needs of breeding birds. Moreover, climate change could result in changes in local marine food web dynamics, altering prey resources in the waters adjacent to the Refuge. The potential decrease in food availability near the Refuge could deter seabirds or pinnipeds from migrating to or even breeding on the Farallon Islands and could reduce the ability for wildlife to rear young.

The GFNMS management plan, the proposed Luckenbach Restoration Plan (if approved) and the Marine Life Protection Act process are likely to benefit wildlife on the Refuge by providing additional protections from human disturbance and funds to enhance or protect seabird nesting habitat. The GFNMS plan will provide increased enforcement and stricter laws protecting Refuge resources, such as wildlife. The proposed Luckenbach Plan will provide increased protection and restoration of resources by funding house mouse eradication and increased public awareness of seabird breeding colonies in the central Coast, including the Refuge. The Marine Life Protection Act process is intended to protect the natural resources in the Gulf of Farallones. Fish in the Gulf are an important foraging resource for the wildlife on the Refuge. The CCP alternatives, coupled with the GFNMS plan, will provide increased protection for wildlife resources. Under Alternatives B, C, and D, the Refuge would expand the restoration of habitat (i.e., creation of burrowing habitat, removal of excess infrastructure, removal of nonnative vegetation, seeding of native vegetation), which would provide new habitat areas. Under all the alternatives, expanded coordination with partners to improve law enforcement would also help to monitor and reduce wildlife disturbance.

House mouse eradication is included in the Alternatives B, C, and D, but a more detailed eradication plan and environmental documentation will be developed subsequent to the CCP to determine the most appropriate method for rodenticide application. While the plan would result in the extermination of house mice on the Refuge, there would be a net benefit to the ashy and Leach's storm-petrel populations on the Refuge which are predated upon by owls and mice. Also,

burrowing owls, which overwinter to feed on the mice would starve or begin predating on storm-petrels once the mouse population on the Refuge crashed. By eliminating mice as a food source, burrowing owls would not be enticed to overwinter on the Refuge. Storm-petrels would also benefit from the removal of problem western gulls included in Alternatives B, C, and D.

Under Alternative C, the introduction of any on-site public opportunities has the potential of damaging wildlife habitat. This could result in added long-term or cumulative stress to Refuge seabird and pinniped populations, in addition to other existing threats aforementioned.

Overall, the alternatives would have long-term benefits for native wildlife species and habitats within the area. The protection of wildlife habitats within the Refuge would benefit the long-term conservation of migratory birds and other native wildlife species. Alternative A, while supporting habitat restoration, may not produce meaningful changes as quickly as the other alternatives. Plant restoration activities prescribed under all the alternatives may help slow erosion of the islands caused by the harsh marine environment. The preferred alternative would integrate wildlife conservation activities with compatible wildlife-dependent opportunities that would represent a cumulative benefit for local wildlife, native plant communities, and human communities.

#### Cumulative Effects on Cultural Resources

Adherence to the policies and regulations pertaining to the protection of cultural resources would avoid or mitigate any significant adverse effects of all the alternatives. No adverse effects on cultural resources are anticipated from any of the alternatives. Climate change could accelerate the deterioration of cultural resources on SEFI. Increased funding will be needed to adequately address the increasing maintenance needs of the historical buildings and structures.

#### Cumulative Effects on the Social and Economic Environment

Because the Refuge is located offshore of San Francisco, the CCP alternatives will not cumulatively affect local and regional traffic. The GFNMS management plan is not likely to generate more visitors to the sanctuary.

The action alternatives, particularly those involving expansion of wildlife-dependent recreation and environmental education, would provide benefits to the public. In addition, the environmental education and outreach programs would attempt to reach a diverse audience.

Under all the alternatives, no significant economic impacts on the local or regional economy are anticipated. Under Alternative C, any evaluated on-site public opportunities may provide some economic benefit to the community. Such benefits could include charter boat operators that would be paid to transport visitors out to the Refuge. The Refuge does not provide any other foreseeable commercial benefits (e.g., farming or fishing) that would be altered under the alternatives. Therefore, few employment and economic opportunities would be gained by any of the alternatives.

**Table 2. Summary Impacts of Alternatives** 

Resource	Alternative A No Action	Alternative B Expand Resource Management; Increase Public Education and Outreach (preferred alternative)	Alternative C Expand Resource Management, Increase Public Education and Outreach, and Evaluates On-Site Opportunities	Alternative D Reduce Human Presence through Closures of Certain Areas to Monitoring and Management Activities; Increase Public Education and Outreach
Physical				
Environment	3T	3T	NT	<b>NT</b>
Hydrology	No significant	No significant	No significant	No significant
Water Ovality/	impact.	impact.	impact.	impact.
Water Quality/ Contaminants	No significant impact.	No significant impact.	No significant impact.	No significant impact.
Geology	No significant	No significant	No significant	No significant
deology	impact.	impact.	impact.	impact.
Air Quality/Climate	No significant	No significant	No significant	No significant
Thi quanty/ Chinate	impact.	impact.	impact.	impact.
Hazardous Materials/	No significant	No significant	No significant	No significant
Safety	impact.	impact.	impact.	impact.
Biological				
Environment				
Vegetation	Reduced nonnative vegetation and increased native vegetation.	Accelerated removal of nonnative vegetation and accelerated increase in native species.	Same as Alt. B; on- site visitor opportunities may increase foot and boat traffic with the potential to increase spread of nonnative vegetation.	Area closures will reduce the spread of nonnative vegetation.
Wildlife	Expanded wildlife habitat.	Expanded wildlife habitat; expanded protection from disturbance; removal of nonnative house mice and problem gulls.	Same as Alt. B; on- site visitor opportunities may result in disturbance to wildlife and damage to breeding habitat.	Increased nesting habitat from area closures; decreased monitoring effort could result in slower detection of problems and management response.
SOCIAL AND ECONOMIC ENVIRONMENT				
Recreation	No significant impact.	No significant impact.	Potential recreational opportunities may	Same as Alt. B.

			be available once a visitor services plan is completed.	
Employment	No significant impact.	No significant impact.	Some jobs or income could be generated from providing on-site visitor opportunities.	Same as Alt. B.
Cultural Resources	No significant impact.	Increased documentation and cultural interpretation.	Same as Alt. B.	Same as Alt. B.

# Chapter 5. List of Planning Team Members and Persons Responsible for Preparing this Document

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# Chapter 6. Coordination, Consultation, and Compliance

# **Agency Coordination and Public Involvement**

The draft CCP and EA were prepared with the involvement of technical experts, community groups, and private citizens. The Service has invited and continues to encourage public participation through planning updates and public comment periods.

#### **Notice of Intent**

A Notice of Intent to prepare a CCP for Farallon NWR was published in the Federal Register on May 31, 2005.

#### **Environmental Review and Consultation**

As a federal agency, the Service must comply with provisions of NEPA. An EA was developed to evaluate reasonable alternatives that would meet stated goals and assess the possible environmental, social, and economic impacts on the human environment. This EA serves as the basis for determining whether implementation of the preferred alternative would result in a federal action significantly affecting the quality of the environment. The EA also acts as a vehicle for consultation with other government agencies and interface with the public in the decision-making process.

#### Other Federal Laws, Regulations, and Executive Orders

In undertaking the preferred alternative, the Service would comply with the following federal laws, Executive Orders (EOs), and legislative acts: Intergovernmental Review of Federal Programs (EO 12372); Archaeological Resources Protection Act of 1979, as amended; Fish and Wildlife Act of 1956; Fish and Wildlife Conservation Act of 1980 (16 USC 661-667e); Fish and Wildlife Improvement Act of 1978; Endangered Species Act of 1973 (16 USC 1531 et seq.); National Environmental Policy Act of 1969; Federal Noxious Weed Act of 1990; National Historic Preservation Act of 1966, as amended; National Wildlife Refuge System Improvement Act of 1997; Antiquities Act of 1906; Protection and Enhancement of the Cultural Environment (EO 11593); Archaeological and Historic Preservation Act of 1974 (PL 93-291; 88 STAT 174; 16 USC 469); Environmental Justice (EO 12898); Management and General Public Use of the National Wildlife Refuge System (EO 12996); Refuge Recreation Act of 1962, as amended; Invasive Species (EO 13112); Migratory Bird Treaty Act of 1918, as amended (MBTA); and Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186).

#### **Distribution and Availability**

The draft CCP and EA has been sent to various agencies, organizations, community groups, and individuals for review and comment. Copies of this EA are available from the San Francisco Bay National Wildlife Refuge Complex, 1 Marshlands Road, Newark, CA, 94536 (phone 510/792 0222).

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# Appendix E. Southeast Farallon Island Plant List (Surveys between 1997-2001)

Scientific Name

\*Agrostis sp.

Amaranthus deflexus \*Amsinckia spectabilis \*Anagallis arvensis

\*Anagallis arvensis f. caerulea

Apium graveolens \*Arnaranthus sp. Aster chileonis

Atriplex sp. (hortensis?)

\*Avena fatua Baccharis pilularis Brassica oleracea \*Bromus diandrus

Bromus carinatus var. maritimus

Bromus maritimus
\*Cakile maritime
Calandrinia ciliate
Cerastium viscosum
\*Chenopodium murale
\*Chenopodium sp.
Cirsium vulgare
Claytonia perfoliata
\*Coprosma repens
\*Coronopus didymus
\*Cotula australis
Crassula connata
Crassula erecta

\*Cupressus macrocarpa
Cymbalaria murale
\*Cynodon dactylon
\*Cyperus sp.
Daucus Carota
\*Digitaria sanginalis
Erigeron glaucous
\*Erodium cicutarium

Gnaphalium luteo-album

 $*Erodium\ moschatum$ 

\*Geranium molle

Grindelia nana var. incarnatum Heliotropium curassavicum

\*Hordeum leporinum
\*Hulkus linatus
Hypochoeris glabra
Juncus bufonius
Lasthenia maritime

Lasthenia minor
\*Lavatera arborea
Leontodon leysseri
\*Lolium multiflorum
Lycopersicum esulentum

\*Malva parviflora Medicago hispida Melica imperfecta \*Meliolotus indicus

Melilotus sp.

Mesembrianthemum chilense

Montia hallii Oxalis corniculata Oxalis suksdorfi Phyllospadix torreyi \*Pinus radiata

 $Plagy oboth rys\ reticulatus \\ *Plantago\ coronopus$ 

\*Poa annua

\*Polycarpon tetraphyllum \*Polygonum arenastrum \*Polypogon monspeliensis

Portulaca oleracea
Psilocarphus tenellus
Raphanus sativus
\*Rumex acetosella
\*Rumex crispus
Sagina occidentalis
\*Senecio vulgaris
\*Sisymbrium orientale
Solanum furcatum
\*Sonchus asper
\*Sonchus oleraceus
Spergularia macrotheca
Spergularia marina
\*Spergularia media

 $*Tetragonia\ tetragonioides$ 

Trifolium fucatum Trifolium incarnatum Trifolium variegatum

\*Urtica urens \*Vulpia bromoides \*Vulpia myuros

 $*Stellaria\ media$ 

 $*Z ante deschia\ aethiopica$ 

\*introduced species

Source: Farallon Plant Notes Excerpted from SEFI Journals 1981-2001 (compiled by Malcolm Coulter)

Appendix F. Special-Status Species on the Refuge

Common and/or Scientific Name	Legal Status: Federal/BCC <sup>1</sup> /State
Ashy storm-petrel (Oceanodroma homochroa)	FC/BSSC
Brown Pelican (Pelecanus occidentalis)	FE/SE <sup>2</sup>
Cassin's auklet (Ptychoramphus aleuticus)	BCC/BSSC
Tufted puffin (Fratercula cirrhata)	-/BSSC
Harbor seal ( <i>Phoca vitulina</i> )	MMPA/-
Northern fur seal (Callorhinus ursinus)	MMPA/-
Stellar sea lion (Eumetopius jubatus)	FT, MMPA/-
Northern elephant seal (Mirounga angustirostris)	MMPA/ST
Guadalupe fur seal (Arctocephalus townsendi)	FT/ST

<sup>&</sup>lt;sup>1</sup>FE, Federally Endangered; FT, Federally Threatened; FC, Federal Candidate; BCC, Bird of Conservation Concern; MMPA, Marine Mammal Protection Act; SE, State Endangered; ST, State Threatened; BSSC, Bird Species of Special Concern; -, no special protection.

<sup>2</sup>The brown pelican has been proposed for federal delisting and was approved for state delisting by the California Fish and Game Commission in

February 2009.

# Appendix G. Summary for 385 Migratory Bird Species Recorded from 1968 to 1999. Table 1 Occurrence and Seasonal Distribution of Birds on Southeast Farallon Island

Residents 7578 29 32 12 21 Winter Total 3747°  $5595^{\circ}$ 5918 22 18 385 5119 Dec 76 73 27 Oct 88 29 Aug 89<sup>b</sup> 350 17 Dec 97<sup>t</sup> 24 Nov 99 High Count and Date 15 Nov 83 2 Oct 96 27 Oct 88 27 Sep ±21 26 Oct ±22 19 Nov ±25 20 Nov ±25 20 Nov ±23 22 Oct ±21 18 Oct ±33 22 Oct ±21 7 Dec 3 Nov ±16 16 Dec Mean E.S.D. Fall 1 Aug-19 Dec 17 Jul-19 Dec 18 Jul-19 Dec 16 Dec 26 Aug-28 Oct 16 Sep-16 Dec 19 Dec 17 Jul-19 Dec 17 Jul-12 Dec 23 Jul-12 Sep- $4254^{\circ}$ 5559° 1426 388 864 39,022 Seasonal 22 Mar 95<sup>b</sup> 32 22 Mar 95 200 19 Apr 90 1853 High Count 1100 1 Jul 95<sup>b</sup> 30 Mar 69 24 Apr 81 8 May 84 5 Mar 77<sup>b</sup> .0 Mar 85b 10 Apr 77 15 Jul 77 and Date 23 Apr ±17 10 May 14 Jul 3 May 28 May 22 Mar ±17 ± S.D. 14 Jul 7 Mar-7 Jul 10 Jul 21 Mar-Mar-14 Jul 2 Mar-13 Jul 1 Mar-29 May 1 Mar-23 Jun 19 Mar-27 Jun 1 Mar-22 Mar l Mar-1 Mar-24 Mar Range )ate Spring  $3213^{\circ}$ 243°  $1535^{\circ}$  $30^{\circ}$ 124 32 8850 238 Seasonal Total 115 53,790 2049 32 154 14,367 418 47 1039 294 9536 Total Aechmophorus occidentalis Phoebastria immutabilis A. occidentalis/clarkii Podilymbus podiceps Total W./Clark's Grebe Slack-footed Albatross Fulmarus glacialis Podiceps auritus Red-throated Loon Yellow-billed Loon<sup>a</sup> Red-necked Grebe aysan Albatross Pied-billed Grebe Northern Fulmar Gavia stellata Common Loon Horned Grebe P. nigricollis Western Grebe P. grisegena Clark's Grebe G. pacifica G. adamsii Pacific Loon G. immer Sared Grebe A. clarkii Species

0	0	0	0	0	0	0	0	0		>	0	0	0		0	0	0	,	
0	0	0	0	379°	9	0	1	41		0	0	0	0		0	$13,613^{\circ}$	0	4	•
1 27 Aug 90	1093 7 Nov 97	30 Oct 98	3 Oct 86	220,125	08 80 80 80 80 80	1	3 Oct 98° 6924	7 Nov 97	14 Oct 97	24 Aug 83	1 11 Son 06	11 360 70	9 Aug 94 1	7 Nov 99 <sup>6</sup>	$\frac{1}{12 \text{ Oct } 75^b}$	5670	9 Sep 84 1	$16  \mathrm{Dec}  88^b$	•
27 Aug	30 Sep +27	14 Oct +18	6 Oct +16	3.Sep +19	12 Nov +21	24 Sep	±16 8 Nov	±13 25 Sep	±29 27 A	27 Aug ±12	11 Sep _	9 Aug	 25 Sep	±27	19 Sep +33	29 Sep	±33 6 Sep	±87	
27 Aug	19 Jul- 18 Dec	15 Sep- 7 Nov	3 Aug-	15 Jul-	23 Aug- 12 Dec	31 Aug-	15 Oct 19 Jul-	12 Dec 27 Jul-	4 Nov	28 Oct	11 Sep	9 Aug	9 Aug-	1 Nov	26 Aug- 12 Oct	15 Jul-	19 Dec 16 Jul−	16 Dec	
1	17,711	25	40,243	3,024,309°	464	9	15,593	13	7 7	C <del>r</del>	1	1	6		2	233,849	က	,	
0	50 31 May 90	0	0	400,000	2 2 4 Mar 916	1.1	21 Mar 95 4	2 Jun 92 1000	18 Mar 77	0	2 1.4 79	0	7	13 Jul 92 <sup>b</sup>	0	2454	8 Jun 88 1	$17  \mathrm{Jun}  93^{b}$	•
1	23 May +28	?   !	1	29 May	3 Mar +2	22 Mar	_ 14 Apr	±40 21 Mar	±12		3 Jul		13 Jun	±26	I	11 Jun	±28 13 Jun	±22	1 1 1 1 1
I	27 Feb- 14 Jul	<u> </u>	I	1 Mar-	1 Mar-	22 Mar	1 Mar-	2 Jun 13 Mar-	23 Jun	l	3 Jul	I	25 Mav-	1 Jul	I	2 Mar-	14 Jul 20 May−	2 Jul	1 / N/-:
0	1184	0	0	$2,259,105^{\circ}$	7		13	1065		0		0	2		0	$20,542^{c}$	က		_
1	18,895	25	40,243	5,283,793	477	7	15,607	1119	71	Ç.	2	1			2	268,004	9		-
Murphy's Petrel Pterodroma ultima	Pink-footed Shearwater Puffinus creatonus	Flesh-footed Shearwater P. carneipes	Buller's Shearwater	Sooty Shearwater	Short-tailed Shearwater P tenningstris	Manx Shearwater	P. puffinus Black-vented Shearwater	Popisthomelas Fork-tailed Storm-Petrel	Oceanodroma furcata	Diack Storing eller O. melania	Red-tailed Tropicbird	Masked Booby	Sula aactylatra Brown Boobv <sup>a</sup>	S. leucogaster	Red-footed Booby <sup>a</sup> S. sula	Brown Pelican	Pelecanus occidentalis Magnificent Frigatebird <sup>d</sup>	Fregata magnificens	O L. L

Table 1 (Continued)

			Spring				Н.	Fall		M	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
American Bittern	r.	0	1	ı	0	5	16 Sep-	10 Oct	1 1/C 01h	0	0
Great Blue Heron	212	12°	3 Mar-	11 Jun	2	198°	26 OC 16 Jul-	9 Sep	16 dae or 9	%	3
Ardea herodias Grost Errot	ις α	6	14 Jul 13 Jun-	±44 14 Jun	6 Jul 88 <sup>6</sup>	ጚ	6 Dec	±24 24 San	18 Sep 92	-	C
Oleal Lyfel A. alba	3	4	14 Jun	14 out	$\frac{1}{13}$ Jun $75^{b}$	3	19 Nov	44 3ep +31	14 Sep 93	7	>
Snowy Egret	45	7	27 Apr-	16 Jun	1	38	18 Jul-	20 Sep	7	0	1
Egretta thula Cattle Egret	104	1	13 Jul 18 Mav	±31 18 Mav	11 May 89º 1	95	19 Dec 16 Sep-	±40 22 Nov	8 Oct 88 21	∞	9
Bubulcus ibis			`	۱ ۱	18 May 94		19 Dec	±17	23 Nov 84		
Green Heron	52		29 Apr-	16 Jun	<b>-</b>	20	1 Aug-	17 Sep	1	0	0
Butorides virescens	ç		13 Jul	+30	14 Jun 87º	5	14 Oct	±17	$22 \text{ Sep } 98^{\circ}$	•	c
black-crowned Inight-Heron	17	-	18 Mar	18 Mar	19 May 05	10	18 Aug-	das 47	2 91 0 + 0 76	<b>-</b>	0
White-faced Ibis	-	0	ı	1 1	10 Mai 73		17 Sep	17 Sep	21 Oct 9/2 1	0	0
Plegadis chihi							•		$18  \mathrm{Sep}  99^{b}$		
Turkey Vulture	2	2	22 May	22 May	2 22 Mar: 70	0	I		0	0	0
Greater White-fronted Goose	306	3	10 Mar-	±0 28 Mar	22 May 19	380	20 Sep-	10 Oct	6	1	0
Anser albifrons			luc 9	±31	10 Mar 80		6 Nov	±13	2 Oct 99		
Emperor Goose <sup>d</sup>	2	0	1	1	0	0	l	1	0	2	
Snow Goose	146	0	1	1	0	146	15 Oct-	5 Nov	128	0	1
C. caerulescens							1 Dec	+3	6 Nov 90		
Ross' Goose	14	0	I	I	0	14	6 Nov-	9 Nov	13 6 Nov. 90	0	0
Canada Goose	915	2	15 Mar-	7 Apr	1 30	688	19 Sep-	8 Nov	401	24	10
Branta canadensis Brant	16 413	1451	30 Apr 18 Mar-	±33 11 Anr	30 Apr 80° 440	14 960	18 Dec	± 1.1 7 Nov	4 Nov 78	6	**
B. bernicla	) ()		22 May	±22	22 Mar 79		18 Dec	9 <del>+</del>	4 Nov 83	1	-

Tundra Swan	11	0	I	I	0	11	11 Nov-	14 Nov +11	10 11 Nov 78	0	0
Wood Duck	2	0	1	1	0	2	21 Sep-	11 Oct	1	0	0
Aix sponsa	œ	C	I	١	C	œ	31 Oct 14 Augr	±20 10 Oct	31 Oct 95b	C	C
Anas strepera	ò	>			•	0	19 Dec	±45	30 Oct 96	>	>
Eurasian Wigeon	Н	0	I	I	0	1	1 Oct	1 Oct	-	0	0
A. penelope								1	1 Oct 98	,	•
American Wigeon	86	0	I	1	0	86	11 Sep-	15 Oct	50	0	0
A. americana							24 Nov	$\pm 15$	18 Oct 99		
Mallard	101	7	31 Mar-	13 Apr	2	94	13 Aug-	24 Oct	13	0	0
A. platyrhynchos			30 Apr	±12	$10 \text{ Apr } 88^b$		8 Dec	±25	16 Oct 99		
Blue-winged Teal	7	0	.	I	0	7	22 Sep-	2 Oct	2	0	0
A. discors							13 Oct	8+ +	5 Oct 90 <sup>6</sup>		
Cinnamon Teal	115	$10^{\circ}$	1 Mar-	2 Mar	7	88	5 Sep-	24 Sep	17	$17^{c}$	0
A. cyanoptera			2 Mar	0 <del>+</del>	2 Mar 79		10 Nov	±12	20 Sep 91		
Northern Shoveler	26		27 Jun	27 Jun		55	14 Aug-	5 Oct	12	0	0
A. clypeata				1	27 Jun 89		14 Nov	+20	1 Oct 98		
Northern Pintail	3554	ς.	12 Mar-	15 Mar	က	3546	27 Jul-	22 Sep	175	က	0
A. acuta			20 Mar	+3	15 Mar 77		8 Dec	±25	19 Oct 78		
Green-winged Teal	381	0	I	I	0	380	14 Aug-	13 Oct	36		0
A. crecca							17 Dec	±25	13 Oct 87		
Canvasback	2	0	I	I	0	2	24 Oct-	11 Nov	-	0	0
Aythya valisineria							28 Nov	±25	24 Oct 88 <sup>6</sup>		
Ring-necked Duck	_	0	1	I	0	1	7 Oct	7 Oct	1	0	0
A. collaris								1	8 Oct 87 <sup>6</sup>		
Greater Scaup	128		24 Apr	24 Apr	-	125	19 Sep-	22 Oct	18	2	0
A. marila				. 1	24 Apr 93		11 Dec	±14	27 Oct 88		
Lesser Scaup	13	0	1	I	0	13	$29  \mathrm{Sep}$	25 Oct	9	0	0
A. affinis							8 Nov	±14	30 Oct 89		
Harlequin Duck	23	က	25 Mar-	22 Apr	2	11	23 Jul-	6 Oct	2	6	വ
Histrionicus histrionicus			20 May	∓28	$24~\mathrm{Apr}~81^b$		19 Dec	±52	2 Dec 78		
Surf Scoter	5405	2245	2 Mar-	4 Apr	200	$2406^{c}$	16 Jul-	12 Nov	233	754	474
Melanitta perspicillata			5 Jul	±21	$21~\mathrm{Apr}~82^b$		19 Dec	±20	13 Nov 89		

 Table 1
 (Continued)

Winter	Residents		87	c	0		0		0		2		0		711		0		0		0		0		0		0		0		က
	Total	2	\$	7	2		12°		0		12		1	,	142		2		0		0		2		0		2		0		2
	High Count and Date	ŗ	35	30 Oct /1	ر د :	9 Oct 85	က	$20 \text{ Nov } 80^{6}$	<b>~</b>	13 Nov 89b	2	17 Dec 78	0	,	01	23 Nov 73	15	25 Oct 70	2	24 Sep 89	2	$19  \mathrm{Sep}  99^{6}$	1	10 Oct 98b	9	6 Oct 94 <sup>b</sup>	13	18 Sep 88	က	29 Sep 74	i
Fall	Mean ± S.D.	;	NOV /	±19	5 Nov	±27	16 Nov	±24	30 Nov	±24	12 Dec	<del>+</del> 7	I	;	24 Nov	±14	25 Oct	±18	19 Sep	±22	12 Oct	±20	30 Oct	±24	20 Oct	±25	8 Oct	±19	1 Oct	8 +I	2 Nov
	Date Range	,	14 Sep-	19 Dec	9 Oct-	9 Dec	16 Oct-	11 Dec	13 Nov-	17 Dec	7 Dec-	17 Dec	İ	(	16 Oct-	19 Dec	27 Sep-	7 Dec	23 Jul-	20 Nov	11 Sep-	8 Dec	1 Oct-	22 Nov	27 Jul-	13 Dec	11 Sep-	29 Nov	12 Sep-	22 Oct	24 Sep-
	Seasonal Total		191	•	13		$14^{c}$		2		2		0	,	1930		56		44		23		5		236		331		28		10
	High Count and Date	3	33	9 Apr 85	_	23 Mar 95 <sup>6</sup>	2	$10 \mathrm{Mar} 81^b$	2	7 Apr 82	2	15 May 70	0	•	9	18 Mar 86 <sup>6</sup>		11 Apr 97		$27 \text{ Apr } 92^{b}$	0		0		<b>-</b> -1	6 Apr 82	0		0		
	Mean ± S.D.	1	5 Apr	7.70 7.70	15 Mar	±11	8 Mar	+3	6 Apr	±2	7 May	±22	I	;	28 Mar	±19	11 Apr	.	6 May	±23	I		i		6 Apr	. 1	١		1		21 Apr
Spring	Date Range	,	I Mar-	լ 6 Jul	7 Mar-	23 Mar	2 Mar-	10 Mar	2 Apr-	7 Apr	12 Apr-	unf 9	I		4 Mar-	17 May	11 Apr	•	29 Mar-	31 May	١.		i		6 Apr	•	l		1		6 Apr-
	Seasonal Total		188	,	2		$2^c$		9		5		0		$23^{\circ}$		-		7		0		0		П		0		0		4
	Total		469		22		31		∞		19				388		56		51		23		7		237		333		28		16
	Species		White-winged Scoter	M. fusca	Black Scoter	M. nigra	Long-tailed Duck	Clangula hyemalis	Bufflehead	Bucephala albeola	Common Goldeneye <sup>d</sup>	B. clangula	Barrow's Goldeneye <sup>d</sup>	B. islandica	Red-breasted Merganser	Mergus serrator	Ruddy Duck	Oxvura jamaicensis	Osprev	Pandion haliaetus	White-tailed Kite	Elanus leucurus	Bald Eagle	Haliaeetus leucocephalus	Northern Harrier	Circus coaneus	Sharp-shinned Hawk	Accipiter striatus	Cooper's Hawk	A. cooperii	Red-tailed Hawk

Rough-legged Hawk	49	0	I	I	0	47	28 Sep-	9 Nov	12	2	4
b. lugopus Golden Eagle	1	0	1	I	0	1	28 Oct	28 Oct	1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0	0
Aquila chrysaetos American Kestrel <sup>d</sup> Edoc promocing	475	4	8 Mar-	25 May	2 11 Mar 80b	460	24 Jul-	8 Oct	28 Oct 71 5 1 Oct 986	11	32
Tarco sparoerras Merlin F - 1	246	0	17 Og	70+	0	246	7 Sep-	10 Oct	30 5 5	0	0
r. columbanus Peregrine Falcon <sup>d</sup>	531	75	1 Mar-	20 Apr	4	428	22 Jul-	14 Oct	96 yet 06	28	103
F. peregrinus Prairie Falcon r	1	0	29 Jun —	+28	29 Mar 95° 0	1	18 Dec 23 Sep	±26 23 Sep	7 Oct 97, 1	0	0
F. mexicanus Virginia Rail P-II. 1	∞	0	l	I	0	∞	11 Aug-	30 Aug	23 Jep 00 2 2 36 Aug 87	0	0
Sora	24	က	28 Mar-	18 May	1	21	21 Jul-	11 Sep	20 Aug 07 2	0	0
Poranza carolina Common Moorhen	က	2	30 Jun 13 May-	±48 25 May	28 Mar 90⁰ 1	-	15 Oct	±21 —	15 Oct 82 0	0	0
Gallinula chloropus American Coot	18	2	6 Jun 11 May−	±17 12 May	22 May 89 $^{b}$	16	11 Aug-	30 Sep	2	0	0
Fulica americana Black-bellied Plover	1156	62	12 May 1 Mar-	±1 30 Mar	$12~\mathrm{May}~81^b$	1068	27 Oct 17 Jol-	±17 25 Sep	29 Sep 96 <sup>6</sup> 42	56	365
Pluvialis squatarola American Golden-Plover	تى	0	11 May —	±16 —	14 Mar 80 <sup>6</sup> 0	5	15 Dec 5 Sep-	±35 13 Sep	26 Oct 81	0	0
P. dominica Pacific Golden-Plover	32	0	1	1	0	32	17 Sep 17 Sep-	±5 11 Oct	$17 \operatorname{Sep} 91^{b}$	0	1
P. fulva Total Lesser Golden-Plover® P. Jamieiroff, Iva	161	က	28 Apr-	8 May	1 20 Mar. 206	157	2 Dec 8 Aug-	±18 7 Oct +23	5 Oct 91 14 17 Oct 89	1	П
Snowy Plover	4	0	- 1 1 1 dy	1	0 (May 00)	4	27 Aug-	17 Sep + 16	1) Cut C) 1 29 Can Q1b	0	0
Semipalmated Plover	300	0	I	.]	0	300	21 Jah	31 Aug +14	22 Jep 71 30 26 Aug 75	0	0
Kildeer <sup>d</sup> C. vociferus	578	18	16 Mar- 16 Jun	14 May ±26	$\frac{2}{4}$ May $80^{b}$	488	12 Jul- 19 Dec	19 Oct ±30	26 Oct 88	72	23

Table 1 (Continued)

			Spring					Fall		W	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
Eurasian Dotterel	2	0	1		0	2	12 Sep-	14 Sep	15 C 00b	0	0
C. morinellus Black-necked Stilt	4	0	I	1	0	2	13 Sep 23 Jun	12 23 Jun	15 Sep 67-	2	0
Himantopus mexicanus American Avocet	9	0	I	I	0	rv	28 Jul-	±0 19 Aug	23 Jun 99 2	П	0
Recurvirostra americana Greater Yellowlegs	87	H	29 Apr	29 Apr	1	98	29 Nov 5 Jul-	±73 22 Sep	29 Nov 95 5	0	0
Tringa melanoleuca Lesser Yellowlegs	63	1	3 May	3 May	29 Apr 68 1	62	2 Dec	±25 2 10 July-21 Aug	20 Sep 91 1g 6	0	0
T. flavipes Solitary Sandpiper	-	0	I	1 1	3 May 71 0	н	27 Sep 7 Sep	±19 7 Sep	16 Aug 87 1	0	0
T. solitaria Willet	934	31	22 Mar-	9 May	23	968		 21 Jun-2 Sej		7	528
Catoptrophorus semipalmatus Wandering Tattler	1744	336	20 Jun 2 Mar-	±25 1 May	6 Mar 83 21	1393		±37 1 Sep		15	375
Heteroscelus incanus Spotted Sandpiper	158	12	16 Jun 20 Apr-	±20 14 May	19 May 76 <sup>6</sup>	146	10 Dec 23 Jul-	+33 6 Sep	_	0	2
Actitis macularia Upland Sandpiper	2	0	14 Jun	±14	25 Mar 94.0	2		±20 25 Aug		0	0
Bartramia longicauda Whimbrel	1437	276	7 Mar-	13 May	06	1153	27 Aug 24 Jun-	±4 29 Aug	2/ Aug 89° 131	8	345
Numenius phaeopus Long-billed Curlew	7	0	19 Jun —	±16 —	19 May 91 0	7	13 Dec 28 Jun- 23 Nor	±29 20 Aug	27 Aug 83 1 30 Sm 96b	0	0
N. americanus Bar-tailed Godwit <sup>a</sup>	Н	0	I	1	0	П	23 Nov 11 Sep	11 Sep	30 3ep 30- 11 Cap 00	0	0
Limosa lapponica Marbled Godwit	260	6	16 Mar-	3 May	2	551	28 Jun-	4 Sep	11 Jep 27 27 14 Aug 75	0	0
Limosa featoa Ruddy Turnstone Arenaria interpres	438	49	13 Mar- 5 Jun	2 May ±21	1 Juli 92 12 6 Mar 87	373	2 Jul- 19 Dec	13 Sep ±35	14 Aug 73 25 16 Dec 87	16	06

Black Turnstone	3851	139	1 Mar-	18 Apr	71	3459	21 Jun-	17 Sep	106 95 Con 75	253	1824
A. metanocepnata Surfbird	261	21	21 Mar-	±29 20 Apr	5 Mar 55	226	17 Jul-	2 Sep	23 Jep 73 19	14	19
Aphriza virgata			2 May	6 <del>+</del>	$21~\mathrm{Apr}~90^b$		19 Dec	∓30	8 Aug 68		
Red Knot	9	0	1	İ	0	9	7 Sep-	17 Sep +10	15 Sen 91 <sup>b</sup>	0	0
Sanderling	195	က	23 Mar-	25 Mar	2	189	-Inf 9	12 Sep	14	3	0
C. alba			29 Mar	+3	23 Mar 90		14 Dec	±31	17 Sep 75		
Semipalmated Sandpiper <sup>e</sup>	12	0	I	1	0	12	3 Aug-	18 Aug	2	0	0
C. pusilla							$16  \mathrm{Sep}$	±10	20 Aug 77		
Western Sandpiper	926	0	1	1	0	970	- 10년 5	31 Aug	96	9	0
C. mauri							14 Dec	±18	1 / Aug 89	,	
Least Sandpiper	208	6	6 Mar-	31 Mar	9	496	10 Jul-	2 Sep	24	က	0
C. minutilla			10 May	±18	31 Mar 90		15 Dec	±21	16 Aug 97		
Baird's Sandpiper	286		11 May	11 May		282	10 Jul-	26 Aug	16	0	0
C. bairdii			•	1	11 May 69		11 Oct	±14	16 Aug 87		
Pectoral Sandpiper	362	1	4 May	4 May		361	27 Jul-	$20  \mathrm{Sep}$	09	0	0
C. melanotos				1	4 May 68		23 Oct	$\pm 12$	20 Sep 91		
Sharp-tailed Sandpiper <sup>e</sup>	9	0	I	I	0	9	2 Sep-	29 Sep	<b>,</b>	0	0
C. acuminata							7 Nov	±27	$17 \text{ Sep } 96^b$		
Rock Sandpiper	18	0	1	1	2	16	19 Oct-	10 Nov	2	2	12
C. ptilocnemis					$3  \mathrm{Apr}  80^{b}$		5 Dec	±14	18 Dec 79 <sup>6</sup>		
Dunlin	174	-	20 May	20 May	1	172	14 Sep-	13 Oct	70		2
C. alpina				1	20 May 71		9 Dec	+11	14 Oct 87		
Buff-breasted Sandpiper	7	0	1	I	0	7	15 Aug-	30 Aug	2	0	0
Tryngites subruficollis							8 Sep	8 + *	29 Aug 78		,
Ruff	-	0	1	I	0	_	15 Oct	15 Oct	-	0	0
Philomachus pugnax								1	15 Oct 93		
Short-billed Dowitcher	1002	13	6 Apr-	3 Jun	11	686	2 Jul-	24 Aug	150	0	0
Limnodromus griseus			13 Jun	±24	13 Jun 93		19 Oct	±20	4 Sep 85		
Long-billed Dowitcher	367	2	11 May−	13 May	<b>,</b>	364	18 Jul-	1 Oct	41	_	0
L. scolopaceus			15 May	+3	15 May $90^{b}$		10 Dec	±25	22 Sep 86		
Wilson's Snipe	148	9	3 Apr-	6 May	<b>→</b>	141	18 Jul−	11 Oct	4	-	0
Gallinago delicata			28 May	±19	9 May 89 <sup>6</sup>		12 Dec	±27	27 Oct 88		

 Table 1
 (Continued)

			Spring				Ц	Fall		Wi	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
Wilson's Phalarope	က	0		1	0	3	20 Jul-	1 Aug		0	0
Phalaropus tricolor							17 Aug	±14	17 Aug 88 <sup>b</sup>	Į	٠.
Red-necked Phalarope	179,227	31,174	12 Apr-	9 May	9009	148,053	19 Jul−	1 Sep	19,500	0	0
P. lobatus			12 Jun	±12	30 Apr 82		28 Nov	±18	22 Aug 68		
Red Phalarope	262,901	21,682	5 Mar-	15 May	3200	240,734	14 Jul-	18 Sep	30,000	485	0
P. fulicarius			12 Jun	±13	8 May 96		19 Dec	±33	4 Sep 94		
South Polar Skua	24	0	I	ı	0	24	26 Aug-	7 Oct	2	0	0
Stercorarius maccormicki							31 Oct	±15	3 Oct 99		
Pomarine Jaeger	773	7	1 Mar-	25 Mar	2	764	3 Aug-	8 Oct	56	2	0
S. pomarinus			27 Apr	±29	1 Mar 90		10 Dec	+20	5 Nov 97		
Parasitic Jaeger	229	1	o Jun	9 Jun	<del></del>	227	20 Aug-	30 Sep	18		0
S. parasiticus				1	9 Jun 95		22 Nov	±19	2 Oct 97		
Long-tailed Jaeger	14	-	29 Apr	29 Apr		13	24 Aug-	7 Sep	-	0	0
S. longicaudus				1	29 Apr 71		23 Oct	±41	11 Oct 99 <sup>6</sup>		
Laughing Gull	2	-	2 Jun	2 Jun	_	-1	3 Aug	3 Aug		0	0
Larus atricilla				1	3 Jun 88 <sup>6</sup>			١	3 Aug 77		
Franklin's Gull	2	1	19 May	19 May	-	1	4 Sep	4 Sep		0	0
L. pipixcan				1	19 May 91			1	4 Sep 83		
Bonaparte's Gull	40,139	37,516	2 Mar-	24 Apr	30,000	2597	28 Sep-	6 Nov	475	56	0
L. philadelphia			28 May	9 <del>+</del>	26 Apr 70		19 Dec	<del>+</del> 6	27 Oct 91		
Heerman's Gull	17,789	288	2 Mar-	15 Apr	40	17,249	15 Jul-	2 Oct	820	252	45
L. heermanni			14 Jul	∓65	20 Jun 97		19 Dec	∓30	9 Aug 83		
Mew Gull	896	43	1 Mar-	17 Mar	3	725	31 Aug-	8 Nov	20	200	18
L. canus			9 May	±14	24 Mar 85 <sup>b</sup>		19 Dec	±19	14 Oct 70		
Ring-billed Gull	160	20	3 Mar-	22 Apr	, ·	127	30 Jul-	18 Oct	9	13	0
L. delawarensis			14 Jul	±49	18 Apr 93 <sup>b</sup>		15 Dec	+31	5 Oct 68 <sup>6</sup>		
California Gull	53,725	1189	1 Mar-	2 Apr	250	51,376	16 Jul-	26 Oct	2500	1160	က
L. californicus			14 Jul	£25	27 Mar 90		19 Dec	±31	7 Nov 97		

Herring Gull 9763	2187c.f	1 Mar-	19 Mar +14	125 4 Mar 77	$3171^{c}$	19 Aug-	21 Nov +20	120 7 Dec 96	$4405^c$	563
	<sub>2</sub> 06	12 5 m 1 Mar-	19 Mar	8	222°	2 Jul-	18 Nov	χ <b>∞</b>	$158^{\circ}$	2
	4012c.f	30 May 1 Mar-	±15 18 Mar	10 Mar 91 350	4670€	19 Dec 20 Jul-	±20 30 Nov	31 Oct 85 440	8713°	1796
	18°	4 Jul 2 Mar-	±14 20 Mar	13 Mar 94 3	$10^{\circ}$	19 Dec 24 Oct–	±23 20 Nov	18 Dec 79 1	$31^{c}$	4
	Ť	6 May	±18	8 Mar 97 <sup>6</sup>	000	15 Dec	+17	$21 \text{ Nov } 98^b$	c	c
	10	26 Mar- 16 Jun	14 May ±18	10 18 May 77	1923	20 Aug- 11 Nov	13 Sep ±12	600 22 Sep 96	>	>
	22,903	1 Mar-	16 Mar	4000	1315	16 Aug-	12 Nov	450	3950	0
	00	1 Jun 26 Mav−	±11 16 Jun	4 Mar 76	25	15 Juc 21	± 12 27 Aug	19 1000 70	0	0
		9 Jul	±16	$13  \mathrm{Jun}  89^b$		10 Oct	±26	$17 \text{ Jul } 83^{b}$		
	0	ı	1	0	2933	2 Aug-	27 Sep	671	0	0
						14 Nov	±16	28 Sep 97	(	•
	0	1		0	12	31 Aug- 28 Sen	13 Sep +9	1 5 Sep 99 <sup>6</sup>	0	0
	1	24 May	24 May	-		23 Aug-	e Sep	7500	0	0
		•	٠	24 May 92		9 Oct	- 6 <del>T</del>	31 Aug 93		
	0	ı	1	0		28 Oct	28 Oct	1	0	0
				,		;	1 ;	28 Oct 86	(	(
	0	1	1	0	7	31 Oct	1 Nov +1	1 Nov 94	0	0
	0	1	l	0	က	11 Oct-	9 Nov	2	0	0
						24 Nov	∓52	24 Nov 99		
	2	7 Mar-	18 Apr	2	17	17 Jul-	31 Aug	2	0	0
		12 May	<del>1</del> 31	12 May 91		16 Dec	±42	20 Jul 996		
	0	1	1	0	56	7 Sep-	13 Oct + 15	12 04 06	0	0
	590	1 Mar-	27 Mar	10	241€	Je Jul-	22 Nov	30	$392^{\circ}$	41
		10 Jun	±25	2 Mar 96		19 Dec	∓30	11 Dec 75		
	16	7 Mar-	6 May	4	7	26 Sep-	19 Oct	2	4	0
		22 Jun	∓40	29 Mar 90		2 Nov	±19	25 Oct 75		

 Table 1
 (Continued)

			Spring				F	Fall		M	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
Rock Dove	183	68	2 Mar-	10 May	3	85	15 Jul-	29 Sep	12	6	0
Columba livia			14 Jul	±31	15 May 77 <sup>6</sup>		16 Dec	±32 <sup>.</sup>	14 Sep 75		
Band-tailed Pigeon	373	157	24 Mar-	27 May	9	214	15 Jul-	17 Sep	4	2	0
C. fasciata			14 Jul	±29	$7 \text{ Jul } 70^{6}$		11 Dec	±37	21 Oct 72		
White-winged Dove	19	0	I	1	0	19	20 Jul-	29 Sep	<del></del>	0	0
Zenaida asiatica	071	100	20 M2	17 M2	7.	363	24 Nov	±28	7 Oct 98¢	•	c
	0/1	761	-10M C2	17 May +91	14 29 Any 68	6/0	_IV 6UII- 2010 8	19 Sep + 73	2 Son 79	<del>1</del> '	>
Black-billed Cuckoo <sup>a</sup>	2	0	B	17-	0	2	26 Aug-	22 Sen	0 Jep 12 1	0	С
Coccyzus erythropthalmus							18 Oct	±38	26 Aug 87 <sup>b</sup>		
Yellow-billed Cuckoo	23	10	14 Jun-	23 Jun	1	13	21 Jul-	31 Aug		0	0
C. americanus			7 Jul	<del>+</del> 0	15 Jun 97 <sup>b</sup>		7 Nov	±32	$10  \mathrm{Oct}  96^{b}$		
Barn Owl	15	-	13 Jul	13 Jul	_	14	3 Aug-	28 Sep	5	0	4
Tyto alba				1	13 Jul 73		27 Oct	±27	27 Oct 99		
Great Horned Owl	_	0	1	1	0	-	21 Nov	21 Nov		0	0
Bubo virginianus								I	21 Nov 70		
Burrowing Owl	304	30	2 Mar-	4 Apr	9	568	28 Aug-	9 Oct	10	9	72
Athene cunicularia			20 May	<del>+</del> 20	10 Mar 97		17 Dec	±21	12 Oct 89 <sup>6</sup>		
Long-eared Owl	22	5	6 Mar-	31 May		52	17 Jul-	$15  \mathrm{Sep}$	က	0	0
Asio otus	į		14 Jul	+53	6 Mar 95 <sup>b</sup>		26 Nov	±37	$5 \text{ Aug } 74^b$		
Short-eared Owl	261	4	16 Apr-	3 Jun	<b>⊢</b> -1	249	16 Jul-	13 Oct	17	∞	4
A. flammeus			5 Jul	∓32	16 Apr 88 <sup>6</sup>		7 Dec	±18	27 Oct 88		
Northern Saw-whet Owl	20	0	1	1	0	18	20 Sep-	27 Oct	2	7	0
Aegolius acadicus							21 Nov	±16	19 Nov 87 <sup>b</sup>		
Lesser Nighthawk	52	44	18 May-	14 Jun	2	∞	19 Jul-	10 Aug	1	0	0
Chordeiles acutipennis			14 Jul	±17	$30  \mathrm{Jun}  80^{b}$		9 Sep	±20	24 Jul 91⁵		
Common Nighthawk	4	2	2 Jun-	ար6		2	8 Sep	8 Sep	1	0	0
C. minor			16 Jun	±10	2 Jun 996			0+	$8 \operatorname{Sep} 87^{b}$		
Common Poorwill	∞ •	0	1	1	0	8	-das 6	11 Oct	1	0	0
Phalaenoptilus nuttallii							31 Oct	±18	29 Oct 93		

Black Swift	20	7	16 May-	11 Jun	က	13	1 Aug-	3 Sep	2	0	0
Cypseloides niger	·	į	8 Jul	±15	11 Jun 75	,	9 Oct	±21	9 Aug 89 <sup>6</sup>	•	•
Chimney Swift	24	11	26 May-	10 Jun	4	13	8 Sep-	$21  \mathrm{Sep}$	5	0	0
Chaetura pelagica			9 Jul	±11	11 Jun 75		2 Oct	8 +I	16 Sep 99 <sup>6</sup>		
Vaux's Swift	1412	14	16 Apr-	25 May	က	1398	21 Jul-	27 Sep	102	0	0
C. vauxi			7 Jul	±23	22 May 83 <sup>6</sup>		27 Oct	8 +1	23 Sep 85		
White-throated Swift	19	14	6 Apr-	14 May	10	5	15 Aug-	8 Oct		0	0
Aeronautes saxatalis			25 May	±19	25 May 99		26 Oct	∓30	26 Oct 97 <sup>b</sup>		
Ruby-throated Hummingbird <sup>a</sup>	4	0	٠	1	0	4	21 Aug-	1 Sep	-	0	0
Archilochus colubris							12 Sep	$\pm 10^{\circ}$	$7 \operatorname{Sep} 94^{b}$		
Black-chinned Hummingbird	5	0		I	0	5	28 Aug-	16 Sep		0	0
A. alexandri							27 Oct	±24	9 Sep 99 <sup>6</sup>		
Anna's Hummingbird	582	45	1 Mar-	25 Apr	2	518	21 Jul	14 Oct	7	19	0
Calypte anna			14 Jun	±30	24 Mar 74 <sup>6</sup>		10 Dec	±22	9 Oct 89		
Costa's Hummingbird	21	16	26 Mar-	12 May	2	5	13 Aug-	16 Sep	<b>.</b>	0	0
C. costae			13 Jul	+30	28 May 85		11 Oct	±31	8 Oct 90 <sup>6</sup>		
Calliope Hummingbird	10	œ	5 Apr-	23 Apr		2	16 Sep-	26 Sep	_	0	0
Stellula calliope			8 May	±14	$13  {\rm Apr}  88^b$		5 Oct	±13	25 Sep 99 <sup>6</sup>		
Rufous Hummingbird	496	$291^{f}$	15 Feb-	11 Apr	. 20	202	19 Jul-	26 Aug	. 10	Ó	0
Selasphorus rufus			4 Jun	±16	$13  {\rm Apr}  78^b$		11 Nov	±17	26 Aug 87 <sup>6</sup>		
Allen's Hummingbird	36	74	5 Feb-	3 May	က	18'	23 Jul-	7 Aug	က	Ó	0
S. sasin			11 Jul	+38	8 May 95b		$12\mathrm{Sep}$	$\pm 12$	3 Aug 87		
Total Rufous/Allen's Hummingbird	681	$407^{i}$	5 Feb-	17 Apr	51	274	19 Jul-	24 Aug	10	Ó	0
S. rufus/sasin			13 Jul	±25	13 Apr 78 $^{b}$		11 Nov	±17	26 Aug 87 <sup>b</sup>		
Belted Kingfisher	143	23	2 Mar-	4 May	2	116	17 Jul-	9 Sep	4	4	24
Ceryle alcyon			11 Jul	∓40	14 Apr 77		1 Dec	±29	15 Sep 74		
Lewis' Woodpecker	∞	Ŋ	29 Apr-	4 May	2	က	-das 9	19 Sep	1	0	0
Melanerpes lewis			8 May	+5	8 May 77 <sup>6</sup>		27 Sep	- 6 <del>+</del>	$12 \operatorname{Sep} 95^b$		
Acorn Woodpecker	14	0		1	0	13	24 Aug-	4 Oct	2	_	0
M. formicivorus							25 Nov	+28	$12 \operatorname{Sep} 89^{b}$		
Yellow-bellied Sapsucker	2	0	1	1	0	2	18 Oct-	24 Oct		0	0
Sphyrapicus varius							29 Oct	8 +I	29 Oct 95 <sup>6</sup>		
Red-naped Sapsucker	2	-	18 Jun	18 Jun	_	4	13 Sep-	29 Sep	1	0	0
S. nuchalis				1	20 Jun 74 <sup>b</sup>		13 Oct	±12	$13\mathrm{Sep}~94^b$		

 Table 1
 (Continued)

			Spring				F	Fall		Wi	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
Red-breasted Sapsucker	21	2	25 Mar-	7 Apr	1	19	27 Sep-	8 Oct	4	0	0
S. ruber			19 Apr	±18	19 Apr 81 <sup>b</sup>		2 Nov	<del>1</del>	2 Oct 68 <sup>6</sup>		
Northern Flicker	604	8	1 Mar-	6 Apr	∞	205	5 Aug-	16 Oct	18	12	32
Colaptes auratus			e Jun	±17	4 Apr 73		18 Dec	±19	3 Oct 86		
Yellow-shafted Flicker	70	7	23 Mar-	13 Apr	က	62	13 Sep-	15 Oct	5		
C. a. luteus			22 May	+20	5 Apr 84		27 Nov	±17	8 Oct 72		
Yellow × Red-shafted Flicker	29	2	26 Mar-	7 Apr	2	54	26 Sep-	16 Oct	က	0	က
intergrade			23 Apr	±12	26 Mar 82		5 Dec	±15	$8 \text{ Oct } 86^b$		
Red-shafted Flicker	371	65	8 Mar-	7 Apr	7	297	5 Aug-	17 Oct	14	6	88
C. a. cafer subspecies group			e Jun	±17	4 Apr 73		18 Dec	±20	5 Oct 72		
Olive-sided Flycatcher	185	104	22 Apr-	22 May	10	81	16 Jul-	8 Sep	∞	0	0
Contopus cooperi			27 Jun	±13	27 May 70 <sup>6</sup>		27 Oct	±16	6 Sep 85		
Western Wood-Pewee	1695	1138	20 Apr-	29 May	80	557	15 Jul-	11 Sep	09	0	0
C. sordidulus			12 Jul	$\pm 12$	28 May 83		19 Nov	±14	6 Sep 85		
Eastern Wood-Pewee <sup>a</sup>	2	-	15 Jun	15 Jun			5 Sep	5 Sep	-	0	0
C. virens				1	15 Jun 75			ı	5 Sep 98		
Yellow-bellied Flycatcher	9	0	I	I	0	9	25 Aug-	10 Sep		0	0
Empidonax flaviventris							27 Sep	±11	$10  {\rm Sep}  97^{b}$		
Alder Flycatcher	2	0	1	1	0	2	27 Aug-	30 Aug	-	0	0
E. alnorum							2 Sep	<del>+</del> 4	$27 \text{ Aug } 88^{b}$		
Willow Flycatcher	414	124	22 Apr-	2 Jun	20	290	20 Jul-	11 Sep	9	0	0
E. traillii			12 Jul	$\pm 14$	5 Jun 69		29 Oct	±14	$25  \mathrm{Aug}  87^b$		
Least Flycatcher <sup>e</sup>	116	7	17 May−	5 Jun	-	109	17 Aug-	23 Sep	4	0	0
E. minimus			luf 8	±16	17 May 85 <sup>b</sup>		22 Nov	±17	26 Sep 76		
Hammond's Flycatcher	158	116	25 Mar-	8 May	12	42	1 Aug-	25 Sep	က	0	0
E. hammondii			17 Jun	±15	9 May 77		28 Oct	±16	$4 \text{ Oct } 86^b$		
Gray Flycatcher	66	84	18 Apr-	4 May	7	15	24 Aug-	13 Sep	5	0	0
E. wrightii			26 May	±10	21 Apr 77		14 Oct	±14	6 Sep 85		
Dusky Flycatcher	110	80	14 Apr-	9 May	∞ (	30	1 Aug-	17 Sep	, o	0	0
E. oberholseri			⊎ Jul	+I5	9 May 69		21 Oct	±17	10 Sep 99º		

Western Flycatcher	1277	305	19 Mar-	20 May	50	972	15 Jul-	12 Sep + 14	65 15 San 03	0	0
E. dijjicilis/occidentalis Black Phoebe	413	15	14 Jui 4 Mar-	2 Apr	7 July 7	377	21 Jul-	10 Oct	13 Jep 73 10	21	89
Sayornis nigricans			17 May	±24	2 Mar 87 <sup>b</sup>		18 Dec	±22	31 Oct 96 <sup>b</sup>		
Eastern Phoebe	23	4	18 May-	29 May	<b>.</b> .	19	24 Sep-	3 Nov	;	0	0
S. phoebe			e Jun	<del>+</del> 8	$2 Jun 91^b$		21 Nov	±15	29 Oct 99¢		
Say's Phoebe	263	$12^{j}$	22 Feb-	1 Apr	2	251	22 Jul-	24 Sep	10	6	4
S. saya			14 May	±26	22 Feb 84		3 Nov	±13	29 Sep 68		
Ash-throated Flycatcher	214	77	16 Apr-	2 Jun	9	136	16 Jul-	31 Aug	7	_	0
Myiarchus cinerascens			10 Jul	±17	12 Jun 75		20 Nov	±25	16 Aug 87		
Great-crested Flycatcher <sup>a</sup>	10	0	1	ł	0	10	5 Sep-	29 Sep	-	0	0
M. crinitus							13 Oct	±11	$30 \text{ Sep } 96^{b}$		
Brown-crested Flycatcher	1	0	I	I	0	_	17 Sep	17 Sep		0	0
M. tyrannulus								I	$18  {\rm Sep}  83^b$		
Tropical Kingbird	14	1	e Jun	e Jun	1	13	7 Aug-	7 Oct		0	0
Tyrannus melancholicus				I	$7  \mathrm{Jun}  91^b$		18 Nov	±29	$23  {\rm Sep}  95^b$		
Cassin's Kingbird	2	_	e Jun	e Jun	1	-	25 Aug	25 Aug	1	0	0
T. vociferans				l	$7 \text{ Jun } 91^b$			1	25 Aug 83		
Western Kingbird	192	69	19 Mar-	5 May	11	123	15 Jul-	6 Sep	ഹ	0	0
T. verticalis			14 Jul	±28	29 Mar 86		20 Oct	±21	19 Oct 69		
Eastern Kingbird	42	14	12 May-	9 Jun	2	78	19 Jul-	3 Sep	2	0	0
T. tyrannus			9 Jul	±17	22 May 92 <sup>6</sup>		28 Sep	$\pm 16$	3 Sep 89		
Scissor-tailed Flycatcher	က	2	18 May−	23 May	-	-	$30  \mathrm{Sep}$	30 Sep		0	0
T. forficatus			27 May	9 <del>+</del>	30 May 99 <sup>6</sup>			1	30 Sep 85		
Brown Shrike <sup>a</sup>	1	0	1	1	0	-	$20  \mathrm{Sep}$	20 Sep	<b>-</b>	0	0
Lanius cristatus								1	$22 \text{ Sep } 84^b$		
Loggerhead Shrike	14	9	3 Apr-	28 Apr	П	∞	26 Jul−	24 Aug	-	0	
L. Iudovicianus			24 May	±17	$6 \text{ May } 90^b$		11 Sep	±15	$10 \text{ Sep } 98^b$		
Northern Shrike	2	0	1	1	0	2	18 Oct-	24 Oct	-	0	0
L. excubitor							29 Oct	8+1	21 Oct 93 <sup>6</sup>		
White-eyed Vireo	2		4 Jun	4 Jun			28 Oct	28 Oct	-	0	0
Vireo griseus				I	$5  \mathrm{Jun}  69^{b}$			I	28 Oct 92		
Bell's Vireod	2	0	l	1	0	2	15 Sep-	17 Sep	100	0	0
V.bellii							18 Sep	±2	19 Sep 93°		

 Table 1
 (Continued)

Violet-green Swallow	1054	f'p69	3 Feb-	13 Apr	10	985	20 Jul-	7 Oct	100	ý)	0
T. thalassina			11 Jul	±35	25 May 99		18 Dec	±13	4 Oct 81		
Northern Rough-winged Swallow	282	<i>51</i> <sup>†</sup>	9 Mar-	21 May	4	255	19 Jul-	31 Aug	15	0	0
Stelgidopteryx serripennis			19 Jun	±25	12 Jun 74		4 Oct	±14	8 Sep 72		
Bank Swallow	48	14	3 May−	20 May	2	34	17 Aug-	23 Sep	12	0	0
Riparia riparia			15 Jun	$\pm 1\dot{2}$	17 May 84 <sup>6</sup>		27 Oct	±26 <sup>.</sup>	19 Oct 98		
Cliff Swallow	163	23	14 Apr-	20 May	ზ	140	17 Jul-	17 Sep	10	0	0
Petrochelidon pyrrhonota			22 Jun	±20	9 May 76 <sup>b</sup>		8 Nov	±24	14 Aug 97		
Barn Swallow	608	232	5 Apr-	18 May	20	217	21 Jul-	20 Sep	<u>,</u> 49	0	0
Hirundo rustica			8 Jul	±19	25 May 99		12 Nov	±18	28 Sep 98		
Red-breasted Nuthatch	1103	34	12 Apr-	22 May	რ	1069	16 Jul-	26 Sep	. 75	0	0
Sitta canadensis			8 Jul	±21	7 May 78		6 Dec	±20	15 Sep 69		
White-breasted Nuthatch	2	<b>-</b>	15 May	15 May		1	10 Oct	10 Oct	,	0	0
S. carolinensis				1	15 May 79			1	10 Oct 69 <sup>6</sup>		
Pygmy Nuthatch	1	0	I	1	0	1	6 Aug	6 Aug	<b>~</b>	0	0
S. pygmaea								· 	6 Aug 69		
Brown Creeper	143	2	14 Apr-	14 May	1	141	27 Sep-	26 Oct	∞	0	0
Certhia americana			13 Jun	±42	18 Apr 78 <sup>6</sup>		24 Nov	6 <del>+</del>	19 Oct 86b		
Rock Wren <sup>d</sup>	263	53	4 Mar-	25 Apr	6	233	19 Aug-	2 Oct	12	_	74
Salpinctes obsoletus			26 Jun	±29	13 Jun 71		26 Nov	±19	11 Nov 72 <sup>b</sup>		
Bewick's Wren	က	0	ı	I	0	က	2 Oct-	16 Oct	_	0	_
Thryomanes bewickii							2 Nov	±16	$19  \mathrm{Dec}  81^b$		
House Wren	184	41	11 Mar-	2 May	2	143	15 Jul-	13 Sep	က	0	က
Troglodytes aedon			13 Jul	<del>1</del> 35	25 Mar 92		30 Oct	±22	$28 \text{ Sep } 94^b$		
Winter Wren	185	23	7 Mar-	14 Apr	2	157	25 Jul-	26 Sep	က	2	2
T. troglodytes			20 Jun	±27	16 Apr 99		1 Dec	±22	21 Oct 72		
Marsh Wren	33	က	1 Apr-	16 May	<b>.</b>	8	15 Aug-	28 Sep	2	0	0
Cistothorus palustris			8 Jun	+39	$8  \mathrm{Jun}  92^{b}$		4 Nov	±19	3 Oct 96 <sup>6</sup>		
Golden-crowned Kinglet	1192	101	27 Feb-	31 Mar	18	1091	17 Sep-	16 Oct	40	0	0
Regulus satrapa			27 Jun	±19	16 Mar 74		14 Dec	±13	6 Oct 93 <sup>6</sup>		
Ruby-crowned Kinglet	4422	1472	7 Mar-	13 Apr	225	2939	26 Jul-	11 Oct	200	11	7
R. calendula			30 Jun	±16	16 Apr 83		19 Dec	±14	30 Oct 91b		
Lanceolated Warbler <sup>a, d</sup>	_	0	1	1	0	-	11 Sep	11 Sep	-	0	0
Locustella lanceolata								1	$12 \operatorname{Sep} 95^b$		

Table 1 (Continued)

Winter	Residents	0	0	Ċ	0	0		0		0		0		0		0		0		21		10		_		0		0	
M	Total	0	0	c	0	0		0		П	1	2		0		0		0		92		462		4		0		Г	
	High Count and Date	1 14 Oct 87b	14 000 97	5 Oct 99 <sup>6</sup>	1 1 Nov 89	-	$26 \operatorname{Sep} 92^b$	-	15 Oct 87 <sup>b</sup>	က	15 Nov 86	2	$30  \mathrm{Sep}  98^{b}$	1	$29 \text{ Sep } 85^b$	2	3 Oct 70	09	$22  \mathrm{Sep}  93^{b}$	320	2 Oct 72	74	23 Nov 96	30	20 Oct 72	2	2 Oct 94	4	10 Aug 74
Fall	Mean ± S.D.	6 Oct	17 Sep	±19	I Nov	17 Oct	±29	14 Oct	I	2 Nov	±12	10 Oct	±16	8 Oct	±17	26 Sep	#	24 Sep	<del> </del>	9 Oct	±16	15 Nov	±22	2 Nov	∓20	12 Oct	±14	8 Sep	±31
Н	Date Range	27 Sep-	13 Aug-	6 Nov	Nov I	26 Sep-	6 Nov	14 Oct		12 Oct-	26 Nov	11 Sep-	3 Nov	26 Sep-	20 Oct	$10  \mathrm{Sep}$	17 Oct	26 Aug-	29 Nov	1 Sep-	18 Dec	21 Jul-	19 Dec	24 Sep-	19 Dec	25 Sep-	31 Oct	15 Jul-	23 Nov
	Seasonal Total	2	20	-	-	2		-		15	,	19		2		11		1554		2149		<i>,</i> 856		490		6		164	
	High Count and Date	0	2	9 Apr 92 <sup>b</sup>	О	-1	11 Jun 71	<del>, -</del>	$2  \mathrm{Apr}  88^{b}$	, — ;	$13  \mathrm{Apr}  75^{p}$	<b>.</b>	9 May 94⁵		28 May 81		11 Jun 75 <sup>6</sup>	35	28 May 71	25	11 May 71 <sup>6</sup>	40	4 Apr 73	22	4 Apr 73	<b>⊶</b>	$23  \mathrm{Jun}  91^{b}$	2	$21\mathrm{Jun}82^{b}$
	Mean ± S.D.		9 Apr	±17		11 Jun	1	1 Apr	I	30 Apr	+33	6 May	±23	28 May	1	4 Jun	±10	24 May	±13	25 Apr	±20	1 Apr	±22	9 Apr	±24	15 Jun	±15	1 Jun	±27
Spring	Date Range	1,	19 Mar-	2 May	ł	11 Jun		1 Apr		3 Apr-	16 Jun	12 Apr-	5 Jun	28 May		28 May-	11 Jun	17 Apr-	12 Jul	1 Mar-	2 Jul	1 Mar-	27 Jun	2 Mar-	15 Jun	29 May-	24 Jun	3 Apr-	10 Jul
	Seasonal Total	0	∞	c	0			-		4	•	4				2		198		480		270		156		က		09	
	Total	2	78	•	→	က		2		20	•	58		က		13		1752		2694		1561		989		12		225	
70	Species	Dusky Warblera	Blue-gray Gnatcatcher	Polioptlia caerulea	Ked-tlanked Bluetall Tarsiger cyanurus	Northern Wheatear	Oenanthe oenanthe	Western Bluebird	Sialia mexicana	Mountain Bluebird	S. currucoides	Townsend's Solitaire <sup>e</sup>	Myadestes townsendi	Veery	Catharus fuscescens	Gray-cheeked Thrush <sup>a</sup>	C. minimus	Swainson's Thrush	C. ustulatus	Hermit Thrush	C. guttatus	American Robin	Turdus migratorius	Varied Thrush	Ixoreus naevius	Gray Catbird <sup>a</sup>	Dumetella carolinensis	Northern Mockingbird	Mimus polyglottos

Sage Thrasher	70	11	19 Apr-	24 May	101	28	12 Aug-	4 Oct	6 6	-1	0
Oreoscopies monumus Brown Thrasher	23	6	1 May	3 Jun	10 May 94.	14	22 Sep-	± 1.9 17 Oct	3 Oct 84 2	0	-
Toxostoma rufum			2 Jul	±19	$3  \mathrm{Jun}  98^b$		10 Nov	±14	9 Oct 74		
Bendire's Thrasher	9	4	17 Apr-	4 Jun	1.00	2	21 Aug-	27 Aug	1	0	0
I. bendirel Europoan Starlingd	50 577	170	14 Jul	±40 11 \ m	92, mc o	EG 124	2. Sep	τ ΣΣΣ:	22 Aug 76°	3966	2150
Sturms malaaris	10,00	710	14 Jul	11 Apr	8 Mar 76	100,101	19 Der	+19	14 Dec 96	2503	0010
Yellow Wagtail	2	0	}   ;	?   !	0	2	12 Sep-	17 Sep	3	0	0
Motacilla flava							21 Sep	9Ŧ	12 Sep 99 <sup>6</sup>		
White Wagtail <sup>a</sup>		0	I	I	0	-	10 Oct	10 Oct	<b>.</b>	0	0
M. alba								I	10 Oct 74		
Olive-backed Pipit <sup>a, d</sup>		0	1	I	0	1	26 Sep	26 Sep	1	0	0
Anthus hodgsoni							•		$29 \text{ Sep } 98^b$		
Red-throated Pipit <sup>e</sup>	31	0	1	I	0	31	20 Sep-	8 Oct		0	0
A. cervinus							3 Nov	±12	5 Oct 91		
American Pipit	4125	23/	5 Mar-	28 Apr	2	4098	-das 9	20 Oct	110	4	0
A. rubescens			3 Jul	+20	25 Apr 89 <sup>6</sup>		19 Dec	±16	27 Oct 88		
Sprague's Pipit <sup>a</sup>	က	0	1	.1	0	က	1 Oct-	9 Oct	<b>⊢</b>	0	0
A. spragueii							16 Oct	<del>+</del> 8	16 Oct 87 <sup>b</sup>		
Bohemian Waxwing		0	I	I	0	1	28 Nov	28 Nov	1	0	0
Bombycilla garrulus								ı	28 Nov 68		
Cedar Waxwing	1245	112	4 May−	28 May	10	1120	16 Jul-	10 Oct	75	13	0
B. cedrorum			20 Jun	<del>+</del>	30 May 82		19 Dec	±23	24 Oct 88		
Phainopepla	2	0	1	1	0	2	$1  \mathrm{Sep}$	14 Sep	1	0	0
Phainopepla nitens							26 Sep	±10	$22 \text{ Sep } 97^b$		
Blue-winged Warbler <sup>a</sup>	-	_	24 May	24 May		0	1	I	0	0	0
Vermivora pinus				1	25 May 92b						
Golden-winged Warbler	9	က	3 Jun-	19 Jun	,	က	2 Sep-	15 Sep		0	0
V. chrysoptera			5 Jul	±16	$3  \mathrm{Jun}  91^b$		29 Sep	±14	$30 \text{ Sep } 98^{b}$		
Brewster's Warbler	<del>, - 1</del>	-	e Jun	9 Jun	Н	0	1	1	0	0	0
V. pinus $\times$ chrysoptera				I	6 Jun 91						
Tennessee Warbler	346	151	22 Apr-	1 Jun	10	195	18 Aug-	1 Oct	7	0	0
V. peregrina			17 Jul	±23	26 May 82		16 Dec	±23	12 Sep 77		

 Table 1
 (Continued)

| Residents              | 3  |   | 0  |   
   
   
   
  | 0  |   | 0   |   | 0   
   |  | 0   |  | 0  |  | 0   |  | 0  
   |  | 0  |   | 77   |   | 56   
   |   
   | -   |   
  | 44  |   | _   |  
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| Total                  | 0,   |   | 0  |   
   
   
   
  | 0  |   | 0   |   | 0   
   |  | 0   |  | 0  |  | 0   |  | 0  
   |  | 0  |   | 437  |   | 145  
   |   
   | က   |   
  | 151   |   | 0   |  
   |
| High Count<br>and Date | 18   | 2 Oct 84  | 4  | $2 \text{ Oct } 96^b$   
   
   
   
  | က  | 1 Oct 68  | -   | 27 Nov 99 <sup>6</sup>  | 1   
   | $10  \mathrm{Sep}  88^{b}$   | . 46  | $10  \mathrm{Sep}  95$   | 7  | 24 Sep 76  | 4   | 7 Sep 86   |  
   | 22 Sep 79 <sup>6</sup>   | က  | 14 Oct 87 <sup>b</sup>  | 185  | 30 Sep 98   | 175  
   | 30 Sep 98   
   | က   | 24 Oct 88   
  | 130   | 24 Oct 88   | 12  | $18~{ m Sep}~94^b$   
   |
| Mean<br>± S.D.         | 21 Sep   | ±23   | 6 Oct  | ±25   
   
   
   
  | 21 Sep   | ±16   | 23 Oct  | ±28   | 22 Sep  
   | ±12  | 12 Sep  | ±14  | 22 Sep   | +11  | 26 Sep  | ±16  | 29 Sep   
   | ±14  | 10 Oct   | ±12   | 19 Oct   | ±18   | 14 Oct   
   | ±18   
   | 17 Oct  | ±18   
  | 23 Oct  | ±16   | $20  \mathrm{Sep}$  | ±19  
   |
| Date<br>Range          | 16 Jul-  | 23 Dec  | 31 Jul-  | 11 Dec  
   
   
   
  | 16 Aug-  | 2 Nov   | 5 Sep-  | 20 Nov  | 9 Sep-  
   | 6 Oct  | 16 Jul-   | 13 Nov   | 2 Sep-   | 3 Nov  | 22 Aug-   | 9 Nov  | 9 Sep−   
   | 31 Oct   | 4 Sep-   | 9 Nov   | 15 Jul-  | 19 Dec  | 15 Jul-  
   | 19 Dec  
   | 7 Sep-  | 3 Dec   
  | 7 Sep-  | 19 Dec  | 26 Jul-   | 30 Nov   
   |
| Seasonal<br>Total      | 1289   |   | 298  |   
   
   
   
  | 34   |   | 7   |   | 7   
   |  | 2132  |  | 182  |  | 164   |  | 31   
   |  | 105  |   | 2400/  |   | 2810   
   |   
   | 72  |   
  | 2688  |   | 431   |  
   |
| High Count<br>and Date | 175  | 30 Apr 71   | က  | 28 Apr 68   
   
   
   
  | . 2  | 13 May 75   | 0   |   | က   
   | $12  \mathrm{Jun}  85^b$   | 09  | 17 May 85  | က  | 24 May 92 <sup>b</sup>   | ∞   | 12 Jun 75 <sup>b</sup>   | က  
   | 19 Jun 77 <sup>6</sup>   | 0  |   | 295  | 30 Apr 71   | 250  
   | 30 Apr 71   
   | 4   | 26 Mar 69   
  | 45  | 30 Apr 71   | 9   | 21 Apr 82  
   |
| Mean<br>± S.D.         | 28 Apr   | ±18   | 10 May   | ±18   
   
   
   
  | 26 May   | ±13   |   |   | 3 Jun   
   | ±16  | 21 May  | ±12  | 8 Jun  | ±12  | o Jun   | <del>1</del>   | 12 Jun   
   | <del>1</del>   | 1  |   | 17 Apr   | ±19   | 16 Apr   
   | ±17   
   | $11  \mathrm{Apr}$  | ±16   
  | 30 Apr  | ±23   | 21 May  | ±17  
   |
| Date<br>Range          | 19 Feb-  | 7 Jul   | 9 Apr-   | 23 Jun  
   
   
   
  | 13 May-  | 17 Jun  | 1   |   | 29 Apr-   
   | P Jul  | 14 Apr-   | 27 Jun   | 1 May-   | 7 Jul  | 12 May-   | 4 Jul  | 26 May-  
   | 30 Jun   | 1  |   | 1 Mar-   | 13 Jul  | 1 Mar-   
   | 13 Jul  
   | 25 Mar-   | 8 May   
  | 1 Mar-  | 18 Jul  | 22 Mar-   | 3 Jun  
   |
| Seasonal<br>Total      | 1228   |   | 63   |   
   
   
   
  | 9  |   | 0   |   | 34  
   |  | 454   |  | 42   |  | 115   |  | 29   
   |  | 0  |   | 1925/  |   | 1592   
   |   
   | 11  |   
  | 267 <sup>†</sup>  |   | 26  |  
   |
| Total                  | 1915   |   | 361  |   
   
   
   
  | 40   |   | 7   |   | 41  
   |  | 2586  |  | 224  |  | 279   |  | 09   
   |  | 105  |   | 8071   |   | 4547   
   | group   
   |   |   
  | 3106  |   | 487   |  
   |
| Species                | Orange-crowned Warbler   | V. celata   | Nashville Warbler  | V. ruficapilla  
   
   
   
  | Virginia's Warbler   | V. virginiae  | Lucy's Warbler  | V. Iuciae   | Northern Parula <sup>e</sup>  
   | Parula americana   | Yellow Warbler  | Dendroica petechia   | Chestnut-sided Warbler <sup>e</sup>  | D. pensylvanica  | Magnolia Warbler <sup>e</sup>   | D. magnolia  | Cape May Warbler   
   | D. tigrina   | Black-throated Blue Warbler  | D. caerulescens   | Yellow-rumped Warbler  | D. coronata   | Audubon's Warbler  
   | D. c. auduboni subspecies   
   | Audubon's × Myrtle intergrad  |   
  | Myrtle Warbler  | D. c. coronata subspecies g   | Black-throated Gray Warbler   | D. nigrescens  
   |
|                        | Seasonal Date Mean High Count Seasonal Date Mean High Count<br>Total Range ± S.D. and Date Total Range ± S.D. and Date Total | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count           Total         Total         Range         ± S.D.         and Date         Total         Total         and Date         Total           strowned Warbler         1915         1228/         19 Feb-         28 Apr         175         687/         16 Jul-         21 Sep         18         0/ | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count           arbler         Total         Range         ± S.D.         and Date         Total         Range         ± S.D.         and Date         Total           arbler         1915         1228/7         19 Feb-         28 Apr         175         687/7         16 Jul-         21 Sep         18         0/           7 Jul         ± 18         30 Apr 71         23 Dec         ± 23         2 Oct 84         0/ | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Pigh Count         Total         Total         And Date         Total         Total         And Date         Total         Total <th< td=""><td>  Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   Total   Range   ± S.D.   and Date   Total   Tota</td><td>Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count           arbler         Total         Total         ± S.D.         and Date         Total         Total           arbler         1915         1228/195</td><td>  Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   /td><td>  Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   /td><td>  Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   /td><td>Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         High Count         Total         High Count         Total         Total         And Date         LSD.         and Date         Total         Total</td><td>Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         High Count         Total         Total         And Date         LSD.         and Date         Total         Total</td><td>Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         High Count         Total         Total</td><td>Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Total         Total         High Count         Total         Total</td><td>Ceasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Pigh Count         Total         Figh Count         Total         High Count         Total         High Count         Total         High Count         Total         Total         High Count         Total         High Count         Total         Total         High Count         Total         Total         High Count         Total         Independent         Total         High Count         Total         Total         Independent         High Count         Total         Total         Independent         Ind</td><td>Ceasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Total         High Count         Total         High Count         Total         High Count         Total         High Count         Total         Total         High Count         Total         High Count         Total         High Count         Total         Total         High Count         High Count</td><td>Ceasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Total         High Count         Total         Total         High Count         Total         Total         High Count         Total         High Count         Total         High Count         Total         High Count         Total         High Count         Total         High Count         High Count         Total         High Count         High Count</td><td>Total         Date Total         Mean         High Count         Seasonal Total         Date Total         High Count         Foral Total         High Count         Total Total Total         High Count         Total T</td><td>Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Range         ± S.D.         and Date         Total         Range         ± S.D.         and Date         Total         Total         High Count         Total         &lt;</td><td>Total         Date Total         Mean Total         High Count Total         High Count Total         High Count Total         High Count Total         Mean Total         High Count Total         Mean Total         High Count Total         Total         Amd Date Total         Total         Fange Total</td><td>  Total   Total   Range   ± S.D.   and Date   Range   ± S.D.   and Date   Total   and Date   and</td><td>Total         Date of Total         Mean         High Count and Date of Total         Seasonal Bate of Total         Date of Total and Date of Dat</td><td>  Total   Range   ± S.D.   and Date   Total   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   A</td><td>Total         Date Date         Mean         High Count Indicated         Seasonal Total         Date And Date Total         High Count Total         Range # 5.D. and Date Total         Total Total         High Count And Date Total         Range # 5.D. and Date Total         Total And Date Total         High Count Total         Total And Date Total         Total And Date Total         High Count Total         Total And Date Total         Total And Date Total         High Count Total         Total And Date Total         High Count Total         Total And Date Total         High Count Total         Total And Date Total         High Count Total         Total And Date Total         High Count High Count Total         High Count High Count Total         High Count H</td><td>Total         Range         ± S.D.         and Date         High Count         Seasonal         Date         Mean         High Count         Total         Range         ± S.D.         and Date         Total         Range         ± S.D.         and Date         Total         <th< td=""><td>Total         Date Total         Mean Fange         High Count Fotal         Seasonal Fotal         Date Fange         High Count Fotal Fot</td><td>Total         Range         ± S.D.         High Count         Seasonal         Date and Date         High Count         Total and Date         Total and Date<!--</td--><td>Total         Date Total         Mean         High Count and Date and Date         Total and Date</td><td>Total         Date of Total         Mean         High Count and Date         Formal Total         Mean         High Count and Date         Total and Date         &lt;</td><td>Total         Date of Total         Mean         High Count and Date         From Total         Range and Date and</td><td>  Total   Seasonal   Date   Mean   High Count   Seasonal   Date   Total   Range   ± S.D.   and Date   Total   Total   Range   ± S.D.   and Date   Total   Total   Total   Total   ± S.D.   and Date   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   /td></td></th<></td></th<> | Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   Total   Range   ± S.D.   and Date   Total   Tota | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count           arbler         Total         Total         ± S.D.         and Date         Total         Total           arbler         1915         1228/195 | Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   Seasonal   Date   Mean   High Count   Seasonal   Date   Mean   High Count   Total   Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         High Count         Total         High Count         Total         Total         And Date         LSD.         and Date         Total         Total | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         High Count         Total         Total         And Date         LSD.         and Date         Total         Total | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         High Count         Total         Total | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Total         Total         High Count         Total         Total | Ceasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Pigh Count         Total         Figh Count         Total         High Count         Total         High Count         Total         High Count         Total         Total         High Count         Total         High Count         Total         Total         High Count         Total         Total         High Count         Total         Independent         Total         High Count         Total         Total         Independent         High Count         Total         Total         Independent         Ind | Ceasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Total         High Count         Total         High Count         Total         High Count         Total         High Count         Total         Total         High Count         Total         High Count         Total         High Count         Total         Total         High Count         High Count | Ceasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Total         High Count         Total         Total         High Count         Total         Total         High Count         Total         High Count         Total         High Count         Total         High Count         Total         High Count         Total         High Count         High Count         Total         High Count         High Count | Total         Date Total         Mean         High Count         Seasonal Total         Date Total         High Count         Foral Total         High Count         Total Total Total         High Count         Total T | Seasonal         Date         Mean         High Count         Seasonal         Date         Mean         High Count         Total         Range         ± S.D.         and Date         Total         Range         ± S.D.         and Date         Total         Total         High Count         Total         < | Total         Date Total         Mean Total         High Count Total         High Count Total         High Count Total         High Count Total         Mean Total         High Count Total         Mean Total         High Count Total         Total         Amd Date Total         Total         Fange Total | Total   Total   Range   ± S.D.   and Date   Range   ± S.D.   and Date   Total   and Date   and | Total         Date of Total         Mean         High Count and Date of Total         Seasonal Bate of Total         Date of Total and Date of Dat | Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   Range   ± S.D.   and Date   Total   A | Total         Date Date         Mean         High Count Indicated         Seasonal Total         Date And Date Total         High Count Total         Range # 5.D. and Date Total         Total Total         High Count And Date Total         Range # 5.D. and Date Total         Total And Date Total         High Count Total         Total And Date Total         Total And Date Total         High Count Total         Total And Date Total         Total And Date Total         High Count Total         Total And Date Total         High Count Total         Total And Date Total         High Count Total         Total And Date Total         High Count Total         Total And Date Total         High Count High Count Total         High Count High Count Total         High Count H | Total         Range         ± S.D.         and Date         High Count         Seasonal         Date         Mean         High Count         Total         Range         ± S.D.         and Date         Total         Range         ± S.D.         and Date         Total         Total <th< td=""><td>Total         Date Total         Mean Fange         High Count Fotal         Seasonal Fotal         Date Fange         High Count Fotal Fot</td><td>Total         Range         ± S.D.         High Count         Seasonal         Date and Date         High Count         Total and Date         Total and Date<!--</td--><td>Total         Date Total         Mean         High Count and Date and Date         Total and Date</td><td>Total         Date of Total         Mean         High Count and Date         Formal Total         Mean         High Count and Date         Total and Date         &lt;</td><td>Total         Date of Total         Mean         High Count and Date         From Total         Range and Date and</td><td>  Total   Seasonal   Date   Mean   High Count   Seasonal   Date   Total   Range   ± S.D.   and Date   Total   Total   Range   ± S.D.   and Date   Total   Total   Total   Total   ± S.D.   and Date   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   /td></td></th<> | Total         Date Total         Mean Fange         High Count Fotal         Seasonal Fotal         Date Fange         High Count Fotal Fot | Total         Range         ± S.D.         High Count         Seasonal         Date and Date         High Count         Total and Date         Total and Date </td <td>Total         Date Total         Mean         High Count and Date and Date         Total and Date</td> <td>Total         Date of Total         Mean         High Count and Date         Formal Total         Mean         High Count and Date         Total and Date         &lt;</td> <td>Total         Date of Total         Mean         High Count and Date         From Total         Range and Date and</td> <td>  Total   Seasonal   Date   Mean   High Count   Seasonal   Date   Total   Range   ± S.D.   and Date   Total   Total   Range   ± S.D.   and Date   Total   Total   Total   Total   ± S.D.   and Date   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   /td> | Total         Date Total         Mean         High Count and Date and Date         Total and Date | Total         Date of Total         Mean         High Count and Date         Formal Total         Mean         High Count and Date         Total and Date         < | Total         Date of Total         Mean         High Count and Date         From Total         Range and Date and | Total   Seasonal   Date   Mean   High Count   Seasonal   Date   Total   Range   ± S.D.   and Date   Total   Total   Range   ± S.D.   and Date   Total   Total   Total   Total   ± S.D.   and Date   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   and Date   ± S.D.   and Date   Total   Total   ± S.D.   
Golden-cheeked Warbler		0	I	1	0	<del>, -</del>	6 Sep	9 Sep	1 9 Son 71	0	0
Black-throated Green Warbler	40	19	9 May-	3 Jun	e 8	21	3 Sep-	12 Oct	,	0	0
<i>D. virens</i> Townsend's Warbler	2078	878	18 Jun 28 Mar-	±13 11 Mav	24 May 83 75	1198	23 Nov 3 Aug-	±24 17 Sep	17 Nov 97 30	2	
D. townsendi			13 Jun	±11,	8 May 69		22 Dec	±21	3 Sep 96		
Townsend's × Hermit Warbler	က		17 Apr	17 Apr	, 1	2	24 Sep-	26 Sep		0	0
D. townsendi × occidentalis		İ		1	17 Apr 74		28 Sep	+3	$29  \mathrm{Sep}  90^{b}$		•
Hermit Warbler	335	72	15 Apr-	8 May	2	263/	21 Jul-	31 Aug	∞ ;	0	0
D. occidentalis			27 May	<del>+</del> 6	10 May 90		20 Nov	±19	9 Aug 73b		
Blackburnian Warbler®	91	9	31 May-	13 Jun		82	31 Aug-	29 Sep	က	0	0
D. fusca			9 Jul	±14	$12  \mathrm{Jun}  89^{6}$		30 Oct	±16	25 Sep 76		
Yellow-throated Warbler	2	က	2 May−	4 Jun	_	2	16 Sep-	4 Oct	1	0	0
D. dominica			8 Jul	+34	7 May 80 <sup>b</sup>		21 Oct	±25	$21 \text{ Oct } 86^b$		
Pine Warbler <sup>a,d</sup>	က	0	1	I	0	က	16 Oct-	28 Oct	-	0	0
D. pinus							18 Nov	±18	19 Nov 87 <sup>b</sup>		
Prairie Warbler	58	0	I	1	0	28	13 Aug-	20 Sep	က	0	0
D. discolor							22 Nov	±23	$15 \operatorname{Sep} 91^b$		
Palm Warbler	1481	37	14 Apr-	2 Jun	4	1444	31 Aug-	17 Oct	47	0	7
D. palmarum			3 Jul	±21	1 Jul 80		11 Dec	±16	9 Oct 93		
Bay-breasted Warbler <sup>e</sup>	64	31	23 May-	10 Jun	2	33/	22 Jul-	27 Sep	က	0	0
D. castanea			29 Jun	±10	$21  \mathrm{Jun}  82^b$		25 Oct	±16	15 Sep 93		
Blackpoll Warbler	869	22	6 May−	11 Jun	2	$641^{f}$	22 Jul-	22 Sep	23	0	0
D. striata			12 Jul	±17	10 Jul 93 <sup>6</sup>		16 Nov	±12	$27 \operatorname{Sep} 74$		
Cerulean Warbler <sup>a</sup>		0	1	1	0	1	23 Oct	23 Oct	<b>.</b>	0	0
D. cerulea								1	$24 \text{ Oct } 81^b$		
Black-and-white Warbler	126	63	18 Apr-	1 Jun	2	63	11 Aug-	18 Sep	2	0	0
Mniotilta varia			9 Jul	±17	6 Jun 75		11 Nov	±16	$18  \mathrm{Sep}  94^b$		
American Redstart	527	86	5 May−	11 Jun	က	438	4 Aug-	$19\mathrm{Sep}$	15	0	0
Setophaga ruticilla			7 Jul	<del>+</del> 11	$6  \mathrm{Jun}  92^b$		8 Nov	±14	15 Sep 75		
Prothonotary Warbler <sup>a</sup>	2	0	1	}	0	2	12 Sep-	3 Oct	1	0	0
Protonotaria citrea							23 Oct	±29	23 Oct 89 <sup>6</sup>		
Worm-eating Warbler <sup>a</sup>	11	∞	7 May−	3 Jun	<del></del>	က	21 Sep-	6 Oct	<b>,</b> → <sup>1</sup>	0	0
Helmitheros vermivorus			20 Jun	±13	$7 \mathrm{Jun} 92^b$		16 Oct	±13	$24 \text{ Sep } 94^b$		

 Table 1
 (Continued)

Total Range ± S.D.
337 200 9 May- 12 Jur
27 Jun ±14
1 0 -
22 17a,f 4 Mar. 2.
14 Jul
ub 19 Jun
54 7 3 Jun- 13 Jun 30 Lm + 4
23 Jun
1 Jul
4403 3226 18 Mar- 13 May
29 Jun
1 0
90 34 14 Apr 12 May
29 17 15 May- 8 Jun

Scarlet Tanagera	9		18 Jun	18 Jun	1 20 5.11. 206	S	29 Sep-	27 Oct + 21	1 24 Oct 91 <sup>b</sup>	0	0
Western Tanager	713	214	15 Apr-	18 May	30 M2 60	499	18 Jul-	10 Sep	21 Cu 71 12 8 Cm 79	0	0
F. Iddoliciana Green-tailed Towhee Pinilo chlorimie	31	∞	3 May-	23 May + 19	0 May 03 1 13 May 926	23	24 Aug-	19 Sep +20	0.0ep 72 1 8 Nov 99b	0	0
Spotted Towhee	582	37f	23 Feb-	15 Apr	4 4 4 20 7 20 7 20 7 20 7 20 7 20 7 20 7	545	29 Aug-	6 Oct	125	<i>/</i> 0	0
F. macunatus Cassin's Sparrow <sup>a</sup>	11	4	2 Jun-	±23 18 Jun	4 Api 73 1	7	20 Dec 13 Sep-	26 Sep	4 Oct 12	0	0
Aimophila cassinii	-	C	11 Jul	±17	6 Jul 82 <sup>6</sup> 0	<del>-</del>	15 Oct 29 Nov	±11 29 Nov	30 Sep 85 <sup>6</sup> 1	0	•
nucus crowned oparrow A. ruficeps	-	>			Þ	•			$31  \mathrm{Dec}  99^{\circ}$	<b>,</b>	1
American Tree Sparrow	92	17	28 Mar-	20 May	2	28	28 Sep-	25 Oct	က		0
Spizella arborea	1090	000	28 Jun	±27	24 May 77	1691	28 Nov	±16	21 Oct 83 <sup>b</sup> 50	-	c
Chipping Sparrow S passering	0761	0.79	13 Jul	10 May +20	30 Apr 71	1071	30 Nov	±21	2 Oct 72	•	>
Chipping × Clay-col. Sparrow <sup>d</sup>	-	0		1	0	_	13 Sep	13 Sep	<b>-</b>	0	0
S. passerina × pallida								1	$16 \operatorname{Sep} 91^b$		
Chipping × Brewer's Sparrow <sup>d</sup>	1	0	I	l	0	_	26 Oct	26 Oct	<b>→</b> }	0	0
S. passerina × breweri								ļ	28 Oct 88 <sup>6</sup>		
Clay-colored Sparrow	547	43	29 Apr-	30 May	က က မ	504	15 Aug-	30 Sep	10	0	
S. pallida			22 Jun	±13	31 May 75	,	8 Dec	£15	.28 Sep 89	•	ć
Brewer's Sparrow	186	88	21 Apr-	26 May	2	148	22 Jul-	18 Sep	φ <del>ί</del>	0	0
S. breweri	,	,	10 Jul	±17	21 May 78	•	von c1	121	.29 Sep /4°	c	c
Field Sparrow <sup>a</sup> S zueilla	-	-	I/Jun	I/Jun	1 109   11 0	0	1	l	0	>	>
S. pusing Black-chinned Sparrow	67.	-	7 Mari	7 May	1	2	30 Aug-	6 Sep		0	0
S. atroqularis	İ	I			7 May 94		13 Sep	±10	13 Sep 93 <sup>b</sup>		
Vesper Sparrow	330	52	4 Apr-	23 May	, 1	302	21 Jul-	28 Sep	7	0	0
Pooecetes gramineus			23 Jun	±19	$16  \mathrm{Jun}  95^b$		18 Nov	±16	6 Oct 72		
Lark Sparrow	315	30	9 Mar-	23 Apr	5	284	29 Jul-	15 Sep	∞ ;	-	0
Chondestes grammacus	Ç.	c	28 Jun	±26	$^{9}$ Apr $^{82^{o}}$	č	13 Dec	±21	1 Oct 74	c	c
Black-throated Sparrow Amphiniza Ailineata	35	œ	1/ Apr- 18 lun	20 May +19	77 MeM 66	54	18 Aug-	14 Sep +14	2 Sen 84	0	>
חיום חקולפווולוווע			TIMO OT	\T-	11 km, 77		100 01		in don o		

 Table 1
 (Continued)

			Spring				д	Fall		Wi	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
Sage Sparrow	8	5	24 Mar-	9 Apr		3	18 Aug-	24 Sep	 	0	0
A. belli	C	•	22 Apr	+11	$22 \text{ Apr } 82^{b}$	i	25 Oct	+34	$1 \text{ Oct } 81^b$		
Lark Bunting	72		24 May	24 May	1	71	5 Aug-	13 Sep	ന്	0	0
Calamospiza melanocorys		i		I	24 May 77		20 Oct	±14	$18  \mathrm{Sep}  93^{b}$		
Savannah Sparrow	7993	215/	22 Feb-	22 Apr	15	7778	16 Jul-	29 Sep	1500	Ó	_
Passerculus sandwichensis			19 Jun	±25	4 Apr 73		23 Dec	+14	29 Sep 68		
Grasshopper Sparrow	145	56	25 Mar-	27 May		119	20 Jul-	6 Oct	4	0	0
Ammodramus savannarum			2 Jul	±22	7 May 92 <sup>6</sup>		29 Nov	±23	$27  \mathrm{Sep}  96^{b}$		
Baird's Sparrow <sup>a</sup>	2	0	1	I	0	2	7 Sep-	18 Sep		0	0
A. bairdii							28 Sep	±15	$7  \mathrm{Sep}  91^b$		
Le Conte's Sparrow <sup>a,d</sup>	∞	0	١	I	0	8	11 Sep-	1 Oct	<b>-</b> -1	0	0
A. leconteii							27 Oct	±16	27 Oct 95 <sup>b</sup>		
Nelson's Sharp-tailed Sparrow	2	0	1	I	0	2	4 Oct-	16 Oct	<b>-</b>	0	0
A. nelsoni							27 Oct	±16	4 Oct 98 <sup>6</sup>		
Fox Sparrow	2483	110	3 Mar-	18 Apr	9	2354	2 Sep-	5 Oct	225	19	28
Passerella iliaca			26 May	±16	2 Mar 99 <sup>6</sup>		17 Dec	±17	18 Sep 93		
Song Sparrow	79	$21^{f}$	29 Feb-	18 Apr	2	28	7 Sep-	10 Oct		Ď	4
Melospiza melodia			26 Jun	<del>+</del> 28	1 Apr 90		13 Dec	±20	2 Oct 84		
Lincoln's Sparrow	2304	531	23 Feb-	19 Apr	40	1773	2 Sep-	29 Sep	450	Ó	0
M. lincolnii			16 Jun	±15	21 Apr 87		4 Dec	$\pm 12$	3 Oct 72		
Swamp Sparrow	95	9	21 Apr-	22 May		88	20 Sep-	17 Oct	2	0	0
M. georgiana			25 Jun	±29	$2 Jun 86^b$		16 Nov	±12	15 Oct 87		
White-throated Sparrow	312	11	22 Apr-	27 May	-	301	8 Sep-	20 Oct	7	0	0
Zonotrichia albicollis			10 Jul	<del>1</del> 26	$14  \mathrm{Jun}  98^{b}$		17 Dec	±15	15 Oct 87		
Harris' Sparrow	21	2	2 May−	9 May	1	19	17 Oct-	5 Nov	2	0	0
Z. querula			16 May	±10	2 May 73 <sup>6</sup>		4 Dec	±14	25 Oct 77 <sup>b</sup>		
White-crowned Sparrow <sup>d</sup>	10,642	1389	4 Mar-	19 Apr	75	9229	15 Jul-	6 Oct	3000	24	56
Z. leucophrys			1 Jul	±13	18 Apr 88		19 Dec	±12	3 Oct 72		

White-cr. × Golden-cr. Sparrow	2	0	I	I	0	2	2 Oct-	8 Oct	<b>.</b>	0	0
<ol> <li>L. reucopnrys × arricapilia</li> <li>Golden-crowned Sparrow</li> </ol>	10,599	495	7 Mar-	27 Apr	65	10,081	13 Oct 11 Sep-	±8 7 Oct	16 Oct 87° 3500	23	100
Z. atricapilla	;		12 Jun	±12	1 May 71		19 Dec	±12	2 Oct 72		
Dark-eyed Junco <sup>a</sup> Junco huemalis	4950	1356	2 Mar- 8 1.1	5 Apr + 16	420	3554	25 Jul-	15 Oct	700	40	က
Oregon Junco <sup>d</sup>	4825	1319	2 Mar-	5 Apr	4 Apr / 3 420	3466	25. 1-1-1-25. -1-1-1-25.	15 Oct	3 Oct 72 700	40	cr.
J. h. oreganus subspecies gro	5		8 Jul	±16	4 Apr 73		19 Dec	±15	3 Oct 72 <sup>6</sup>	2	)
Slate-colored Junco	125	37	1 Mar-	1 May	. 2	88	24 Sep-	24 Oct	က	0	0
J. h. hyemalis subspecies group	dn		14 Jun	±26	2 May 90⁵		18 Dec	±18	15 Oct 87 <sup>b</sup>		
Lapland Longspur	552	Ω.	4 May-	31 May		547	20 Jul-	16 Oct	16	0	0
Calcarius lapponicus	,		24 Jun	±25	5 May 87 <sup>6</sup>		9 Dec	±17	28 Oct 91		
Chestnut-collared Longspure	61	က	18 May−	20 Jun	1	28	20 Sep-	18 Oct	7	0	0
C. ornatus			16 Jul	∓30	18 May 80⁵		3 Dec	±14	14 Oct 87		
Snow Bunting <sup>a</sup>	22	0	1	!	0	25	22 Oct-	31 Oct	4	0	0
Plectrophenax nivalis							18 Nov	8 +1	28 Oct 91		
Rose-breasted Grosbeak <sup>e</sup>	274	169	13 May−	8 Jun	9	105	17 Jul-	20 Sep	က	0	0
Pheucticus Iudovicianus			14 Jul	±12	9 Jun 77 <sup>6</sup>		13 Nov	±22	$19  {\rm Sep}  93^{b}$		
Rose-br. × Black-hd. Grosbeak	4	_	8 Jun	8 Jun	_	က	18 Sep-	2 Oct		0	0
P. Iudovicianus × melanocepha	ılus			1	8 Jun 70		21 Oct	±17	21 Oct 88		
Black-headed Grosbeak	315	137	2 Apr-	12 May	10	178	16 Jul-	4 Sep	4	0	0
P. melanocephalus			14 Jul	±18	9 May 69 <sup>6</sup>		20 Nov	±20	9 Sep 80		
Blue Grosbeak	72	11	9 May−	27 May		61	14 Aug-	7 Sep	. 2	0	0
Passerina caerulea			18 Jun	±14	$10  \mathrm{Jun}  94^b$		6 Oct	±13	$21 \operatorname{Sep} 99^{6}$		
Lazuli Bunting	369	78	6 Apr-	16 May	2	291	22 Jul-	8 Sep	50	0	0
P. amoena			12 Jul	±19	9 <b>Ma</b> y 90		8 Nov	±16	18 Sep 71		
Indigo Bunting <sup>e</sup>	141	93	7 May-	8 Jun	9	48	18 Jul-	13 Sep	2	0	0
P. cyanea			14 Jul	±15	20 Jun 82		13 Dec	±42	3 Sep 86		
Painted Bunting	∞	0	1	1	0	∞	$10~\mathrm{Sep}$	25 Sep		0	0
P. ciris							21 Oct	±13	21 Oct 97 <sup>6</sup>		
Dickcissel	30	14	13 May-	4 Jun	-	16	24 Aug-	17 Sep	2	0	0
Spiza americana	,	:	7 Jul	±16	7 Jul 91 <sup>b</sup>		14 Oct	±17	$3  \mathrm{Sep}  88^b$		
Bobolink	216	13	24 May-	10 Jun	, I	203	16 Aug-	22 Sep	9	0	0
Dolichonyx oryzivorus			4 Jul	±14	$30  \mathrm{Jun}  95^b$		15 Nov	±13	24 Sep 74 <sup>6</sup>		

% Table 1 (Continued)

			Spring				L.,	Fall		8	Winter
Species	Total	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Seasonal Total	Date Range	Mean ± S.D.	High Count and Date	Total	Residents
Red-winged Blackhird	822	49	4 Mar-	25 Apr	9	692	20 Jul-	7 Oct	9	4	0
Agelaius phoeniceus	! !	1	11 Jun	+23	22 Apr 97 <sup>6</sup>		18 Dec	±19	30 Sep 68		
Tricolored Blackbird	66	7	8 Mar-	30 Apr		91	21 Sep-	14 Oct	. 40	_	0
A. tricolor			14 Jul	±51	12 Jun 75 <sup>b</sup>		21 Nov	±13	7 Oct 92		
Western Meadowlark	2516	52	9 Mar-	27 Apr	45	2447	23 Jul-	14 Oct	125	17	224
Sturnella nealecta			5 Jul	÷30	10 Mar 87 <sup>b</sup>		16 Dec	±17	4 Oct 72 <sup>6</sup>		
Yellow-headed Blackbird	100	25	27 Apr-	12 May	က	75	27 Jul-	12 Sep	2	0	0
Xanthocephalus xanthocen	halus		12 Jun	÷	13 May $75^{b}$		210ct	+20	$11  \mathrm{Sep}  98^b$		
Rusty Blackbirde	11	က	15 Apr-	20 Apr	1	∞	17 Oct-	29 Oct		0	0
Euphagus carolinus			22  Apr	+4	15 Apr 85 <sup>b</sup>		19 Nov	$\pm 11$	31 Oct 91 <sup>b</sup>		
Brewer's Blackbird	1246	173	16 Mar-	25 Apr	. 20	1060	17 Jul-	14 Oct	63	13	_
E. cvanocephalus			30 Jun	±18	27 Apr 71		18 Dec	±17	19 Oct 96		
Brown-headed Cowbird	2802	554	26 Mar-	5 May	20	2248	15 Jul-	29 Aug	53	0	0
Molothrus ater			14 Jul	±14	7 May 78		1 Dec	±21	$26  \text{Aug}  87^b$		
Orchard Oriole®	53	2	11 Jun-	25 Jun	-	51	14 Aug-	18 Sep	2	0	0
Icterus spurius			lul 6	±20	$11  \mathrm{Jun}  88^b$		25 Oct	±15	$11 \operatorname{Sep} 99$		
Hooded Oriole	18	-	16 Apr	16 Apr	1	17	20 Jul−	3 Sep	က	0	0
I. cucullatus			•		$18  {\rm Apr}  90^{b}$		19 Nov	+29	$21  \mathrm{Aug}  87^b$		
Bullock's Oriole	682	133	19 Mar-	28 Apr	7	549	3 Jul−	19 Aug	15	0	0
I. bullocki			20 Jun	±17	21 Apr 87		27 Nov	+20	9 Aug 73		
Bullock's × Baltimore Oriole	4	-	4 Jun	4 Jun	-	က	20 Sep-	23 Sep	1	0	0
I. bullocki × galbula				I	4 Jun 70		28 Sep	∓4	$29  \mathrm{Sep}  79^{6}$		
Baltimore Oriole	42	10	26 May-	3 Jun	2	32	5 Sep-	2 Oct	2	0	0
I. galbula			11 Jun	9 <del>T</del>	26 May 70		30 Nov	±20	$7 \text{ Sep } 89^{b}$		
Scott's Oriole <sup>d</sup>	3	0	I	I	0	က	12 Sep-	17 Oct		0	0
I. parisorum							10 Nov	±31	10 Nov 93 <sup>6</sup>		

	0		0		0		1		0		0		0		0		2		18,525
9	0		10		_		45		∞		0		0		0		-		55,809
250	4 oct /2	27 Oct 96	18	16 Nov 90	12	4 Nov 87	400	3 Oct 72	20	$17 \operatorname{Sep} 99$	9	1 Oct 74	20	22 Oct 96	П	$22 \text{ Sep } 79^b$	15	19 Oct 97 <sup>b</sup>	
13 Oct +14	30 Oct	±23	21 Oct	±23	26 Oct	±16	14 Oct	±18	29 Sep	±21	8 Oct	±13	13 Oct	±15	30 Sep	<del>+</del> 6	14 Sep	±43	
18 Aug-	5 Oct-	11 Dec	19 Jul−	19 Dec	8 Sep-	6 Nov	16 Jul-	19 Dec	15 Jul-	19 Dec	16 Sep-	31 Oct	21 Aug-	15 Nov	20 Sep-	3 Oct	16 Jul-	10 Dec	
782	9	;	401		22/		1893		1357		22		349		3		6		4,068,051
7	1	21 Apr 87 <sup>b</sup>	23	26 Apr 83		18 Jun 98	80	17 Apr 74	9	9 Mar 79	_	8 Apr 77	5	15 May 75 <sup>b</sup>	1	27 May 74	18	22 Apr 96	
20 Apr +17	6 May	±34	$20  \mathrm{Apr}$	±24	18 Jun	!	23 Apr	±36	27 Apr	±37	4 May	±24	18 May	±15	27 May	1	23 Apr	±18	
9 Mar-	12 Apr-	14 Jun	9 Mar-	1 Jul	18 Jun		7 Mar-	14 Jul	29 Feb-	11 Jul	8 Apr-	26 May	16 Apr-	13 Jun	27 May		9 Mar-	1 Jul	
111	က	į	360		$1^{f}$		46		49		က		90				237		2,446,727
668	6	İ	771								25		379		4		247		,570,133
Purple Finch	bulpuleus			sn		rostra	Pine Siskin	inus	ıch		oldfinch	<i>'5</i> '	ldfinch		beak	istes vespertinus	House Sparrow <sup>d</sup>	esticus	9

Species formerly or currently reviewed by the CBRC. Except as noted here or in the annotations following this table, all records within the CBRC's review period for the species have been accepted by the CBRC or are under review. It is possible that some records presently under review will not be accepted.

Seasonal high count duplicated on more than one date; the date given is the most recent.

See notes following the table for information on race, unusual patterns of patterns of occurrence, or individual records of interest. Patterns of arrival appear to overlap two or more seasons. See notes for reinterpretations of seasonal data.

<sup>&</sup>quot;The totals may include one or more record not reviewed by the CBRC during the period in which the species was on the CBRC review list.

Small numbers of individuals were reclassified to season using our definitions, are anomalously late or early within season, or are known immature dispersants included in the spring totals. See notes for specification of these records and, in some cases, reinterpretations of seasonal data.

Appendix H. Wilderness Management Plan

## WILDERNESS MANAGEMENT PLAN

#### FARALLON NATIONAL WILDLIFE REFUGE

FARALLON WILDERNESS

WILDERNESS MANAGEMENT PLAN

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

FREMONT

CALIFORNIA

JUNE 1978

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#### I. INTRODUCTION

## A. Refuge Establishment

In 1909, President Theodore Roosevelt signed Executive Order 1043 creating the Farallon Reservation, "... a preserve and breeding ground for native birds." Included were Middle Farallon, the North Farallons and Noonday Rock. Southeast Farallon and adjacent rocks were added by secondary withdrawal in 1969.

# B. Brief Refuge Description

About 30 miles west of San Francisco, the vastness of the Pacific Ocean is interrupted by several small islands. These are the Farallons --"little pointed islets of the sea".

Southeast Farallons are 18 miles from Point Reyes, and 23 miles from Point Benita at the entrance of San Francsico Bay. Several rocks are included in this group, the total area being about 120 acres. The main island reaches a height of 340 feet above sea level, is approximately 70 acres in size, and has the only major horizontal area.

Two miles northwest is Middle Farallon, a single rock 50 yards in diameter and 20 feet high. The North Farallons are 4 miles north, and consist of 2 clusters of bare, precipitous islets and rocks. They reach a height of 155 feet above sea level. The total refuge area is 211 acres.

Geologically the Farallon Islands are a granitic formation of a decomposing type. There are some pockets of shallow soil, particularly on the less vertical portions of Southeast Farallon.

The climate is characterized by frequent, strong winds and dense fog. Rainfall occurs mainly during winter, with summer moisture usually limited to damp fogs. Annual precipition is approximately

10 inches. Temperatures are almost constant year-round, seldom falling below  $40^{\circ}F$ , or rising above  $60^{\circ}F$ .

# C. Refuge Objective

The major objective is to provide continued protection against human disturbance and to gain additional information about the islands' wildlife to insure optimum wildlife use and productivity.

# D. Relationship of Wilderness to Refuge Objectives

Wilderness designation of the suitable portion of the refuge is entirely compatible with the purpose for which it was established and enhances the existing objective of preserving physical and biological qualities in a natural condition for optimum wildlife use and productivity.

# E. Wilderness Area Establishment

The Wilderness Act of September 3, 1964 (Public Law 88-577), directed the Secretary of the Interior within 10 years to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within national wildlife refuges and game ranges and to recommend to the President the suitability of each such area or island for formal preservation as wilderness.

The Farallon National Wildlife Refuge, excluding Southeast Farallon, was given wilderness status on December 26, 1974, with passage of Public Law 93-550 (Appendix 1).

Title 1, Section 101, states in part,"... certain lands in the Farallon National Wildlife Refuge, California, which comprise about one hundred and forth-one acres and which are depicted on a map entitled 'Farallon Wilderness--Proposed' and dated October 1969, and revised March 1970, are hereby designated as wilderness.

# II. DESCRIPTION OF THE WILDERNESS AREA

- The Farallon Wilderness Area is comprised of small rocks and islets adjacent to Southeast Farallon Island lying approximately 18 miles from Point Reyes and 23 miles from Point Benita at the entrance of San Francisco Bay. Two miles northwest is Middle Farallon, a single rock 50 yards in diameter and 20 feet high (Photo 1, Appendix 2). The North Farallons are 4 miles north, and consist of 2 clusters of bare, precipitous islets and rocks extending over about 1 mile of ocean (Photo 2, Appendix 2). They reach a height of 155 feet above sea level. Noonday Rock is the westernmost rock, located about 3 miles northwest of the North Farallons. It is almost completely submerged and is awash most of the time.
- B. Map (from Wilderness Proposal and refuge brochure, Appendices 3 and 4).

## III. MANAGEMENT

Isolation and inaccessibility have kept people off the northern island groups. These same factors plus agreements with the Point Reyes Bird Observatory (Appendix 5) and the Coast Guard (Appendix 6) have limited visitation to Southeast Farallon. The Observatory mans Southeast Farallon year-round to ward off unauthorized human visitors as well as to take census counts and to conduct research.

Wildlife management is confined to periodic inventories of wildlife resources of the islands and the accumulation of information having an influence on these resources.

Appendix 7 provides the detailed rules and regulations regarding refuge wilderness preservation and management.

#### IV. PUBLIC USE

#### A. General

The northern three groups are inaccessible and Appendix H

landing on Southeast Farallon is safe only during calm seas. Use is restricted to Southeast Island and this is controlled by a cooperative agreement between the Service and Point Reyes Bird Observatory.

- 1. The current volume of visitation for those islands and islets within the Wilderness Area is zero. Visitation over the next ten-year period will remain at the zero level due to the inaccessibility of the islands. Therefore there will be no impact on wilderness values.
- .2. Current visitor control is limited to the Southeast Island and is handled under co-operative agreements with Point Reyes Bird Observatory and the United States Coast Guard.

Firearms are not permitted on the islands.

3. Permits are issued from the San Francisco
Bay NWR Complex for landing, scientific
research, collecting and other activities
on Southeast Island.

# B. Specific Activities

Bay Area Chapters of the National Audubon Society sponsor annual bird-watching charter boat tour trips around the southern islands, and similar excursions are likely to remain the only possible type of public use.

#### V. PUBLIC HEALTH AND SAFETY

#### A. Potential Threats or Hazards

Radioactive waste which was dumped 7 miles southwest of the Farallon Islands 22 years ago is nowpendix H leaking into the water. The Pacific dumpsite, in about 5,000 feet of water, was used to dispose of 47,500 drums. Scientists have said that about 25 percent of the drums are now leaking. The Service is concerned about the proximity of the Farallons to the radioactive waste disposal site because the Southeast Island is inhabited and supports abundant birdlife and marine mammals.

## B. Search and Rescue

Search and rescue operations would be coordinated with the U.S. Coast Guard. The actual operations would be conducted by the Coast Guard as they are properly equipped to carry out high-sea searches and rescues.

Because the islands are isolated and virtually inaccessible, helicopters would have to be used to remove individuals from all but Southeast Farallon. Except in the cases of severe injury or serious illness, U.S. Coast Guard boats would be utilized only on Southeast Farallon.

## VI. RESEARCH

At present there are no ongoing research projects. Access to the islands is not possible most of the time thus limiting the kinds of projects that can be undertaken. Visual observations and censuses of birds and marine mammals on the North Farallons have been made from ships some distance from the islands. This type of information may be obtained sporadically throughout the year.

#### VII. OTHER CONSIDERATIONS

A. <u>Placement of hydrological, meteorological, seismic,</u> navigational, or other instrumentation.

Sales are now pending (Sale 53) on OCS lands

adjacent to the islands. The islands will remain inviolate to use as triangulation points, targets, navigational aids or any other kind of intrusion or development associated with the exploration and development of the gas and oil resources.

# B. Oil Spills and Other Catastrophies

Detected oil spills will be handled according to USFWS's guideline, "Pollution Response Plan for Oil and Hazardous Substances" (revised June, 1977). All spills will be reported to the National Response Center which will then contact the appropriate Regional Response Center for action. Refuge personnel will assist oiled bird rescues by providing land transportation to local rehabilitation centers.

# C. Entry for Official Purposes

Because of inaccessibility of the wilderness area, entry will not generally be possible. If occasion warrants it, entry may occur after permission has been obtained from the Refuge Manager.

#### VIII. FUNDS AND PERSONNEL

Additional funds and personnel for the administration of this wilderness should not be necessary because of the infrequent number of visitations anticipated.

#### IX. PLAN CURRENCY

Periodic review may occur on an annual basis if necessary. This could be done concurrently with review of refuge research goals for the Farallon National Wildlife Refuge.

#### APPENDIX LIST

- 1. The Act Establishing Farallon National Wildlife Refuge
- 2. Photographs of Middle Farallon and the North Farallons
- 3. Wilderness Study Brochure
- 4. Southeast Farallon National Wildlife Refuge Brochure
- 5. Cooperative Agreement FWS/PRBO
- 6. Cooperative Agreement FWS/USCG
- 7. Refuge Wilderness Regulations (50 CFR 35)

#### REVIEW AND APPROVAL PAGE

Concurrence:	Date:	
Concurrence:	Date:	
Concurrence:	Date:	

APPENDIX 3

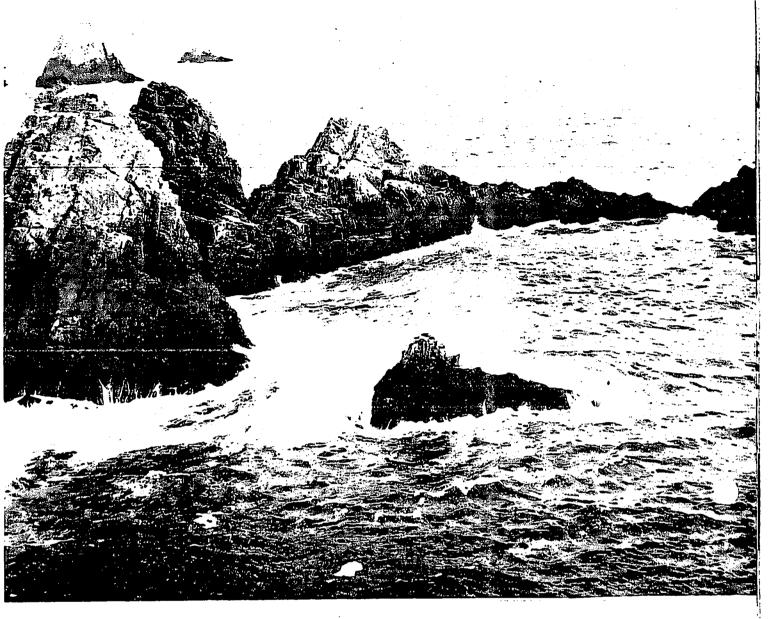
## FARALLON

WILDERNESS PROPOSAL

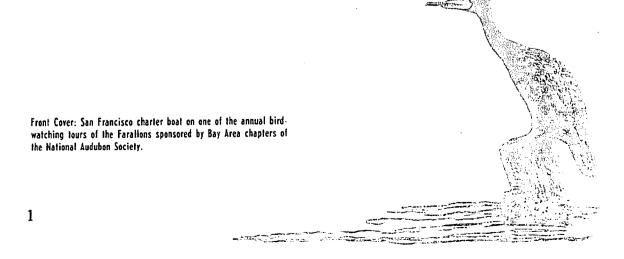
BLUE HOR ZON

FARMEON NATIONAL WILDLIFE REFUGE

CALIFORNIA



Above: The North Farallon Islands march silently across a misty sea.



#### **PREFACE**



The Wilderness Act of September 3, 1964 (Public Law 88-577) requires that the Secretary of the Interior review every roadless area of 5,000 contiguous acres or more and every roadless island, regardless of size, within the National Wildlife Refuge System within ten years after the effective date of the Act, and report to the President of the United States his recommendations as to the suitability or nonsuitability of each such area or island for preservation as wilderness. A recommendation of the President for designation as wilderness does not become effective unless provided by an Act of Congress.

In defining wilderness, the Act also included areas of less than 5,000 acres that are of sufficient size to make preservation and use in an unimpaired condition practicable.

Sections 4(a) and (b) of the Wilderness Act provide that: (1) The Act is to be within and supplemental to the purposes for which National Wildlife Refuges are established; and (2 Wilderness areas shall be administered so as to preserve their wilderness character and shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation and historical use insofar as primary refuge objectives permit. Wilderness designation does not remove or alter an area's status as a National Wildlife Refuge.

This brochure describes a national wildlife refuge that has been studied by the Bureau of Sport Fisheries and Wildlife at the direction of the Secretary of the Interior to determine its potential for inclusion in the National Wilderness Preservation System.



#### THE NATIONAL WILDLIFE REFUGE SYSTEM

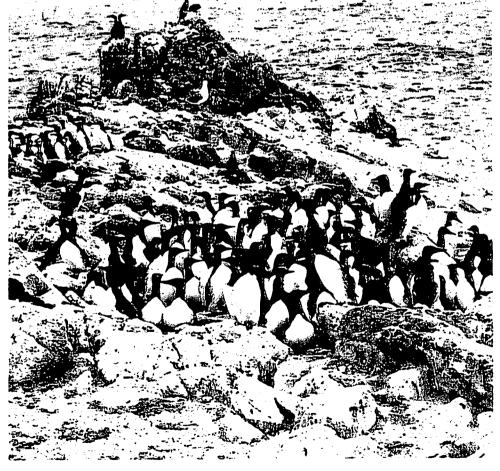
The Refuge System is a National network of lands and waters managed and safeguarded for preservation and enhancement of the human benefits associated with wildlife and their environments. It presently consists of over 320 units, embracing nearly 30 million acres in 46 States. About 90 refuges containing 25 million acres in over 30 States qualify for study under the Wilderness Act.

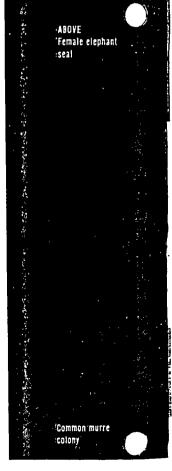
#### INTRODUCTION

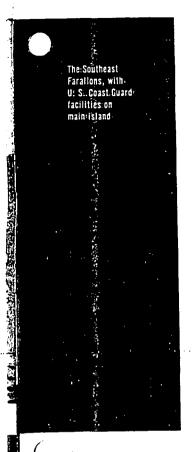
About 28 miles west of San Francisco, California, the vastness of the Pacific Ocean is interrupted by several small islands. These are the Farallons, "little pointed islets in the sea." They extend for about seven miles in a northwesterly direction, and are roadless, essentially inaccessible, and, with one exception, undeveloped. A Coast Guard lighthouse installation exists on Southeast Farallon.

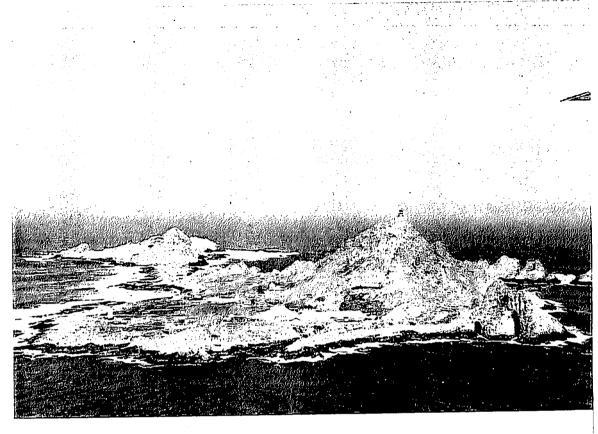
The islands comprise an important sea bird rookery, hosting upwards of 150,000 to 200,000 birds each summer. Their value as sea bird production areas led to the establishment of a Federal wildlife sanctuary embracing the northern three island groups in 1909. The Southeast Farallons were added in 1969, and the refuge now totals 211 acres.











#### HISTORY

The first known visitor to the Farallon Islands was Juan Rodriquez Cabrillo, who sailed along the California coast in 1539. Later, Sir Francis Drake anchored off the islands to replenish his ship's food supply with seals and birds. In the late 18th and 19th centuries, Americans and Russians exploited the sea lions, fur seals and sea otters then found in abundance around the islands.

The Farallons experienced their heaviest human pressure as a result of the phenomenal population growth that accompanied California's Gold Rush. Demand for food far exceeded normal supplies, and San Francisco markets were soon provided with millions of sea bird eggs taken from the islands. One of the "egg companies" formed during this period reputedly gathered and sold close to four million murre eggs between 1850 and 1856.

Competition between organized collectors and "independents" was strong, and the bird colonies were the scene of many a brawl and even a few shooting incidents. Egg collecting continued at a high level until 1890, when restrictions by the Secretary of the Interior and a declining market for murre eggs brought the Farallon "Egg Wars" to an end.

In 1909, President Theodore Roosevelt signed Executive Order 1043 creating the Farallon Reservation, "...a preserve and breeding ground for native birds." Included were Middle Farallon, the North Farallons and Noonday Rock. Southeast Farallon and adjacent rocks were added by secondary withdrawal in 1969.

All of the major islands were probably visited during the "Egg War" days. However, landing on all but Southeast Farallon is extremely difficult and hazardous. There have been no recorded visits to the three northern island groups since establishment of the refuge, although Bureau of Sport Fisheries and Wildlife personnel do make occasional aerial inspections.

#### PHYSICAL DESCRIPTION

The Southeast Farallons are 18 miles from Point Reyes, and 23 miles from Point Bonita at the entrance of San Francisco Bay. Several rocks are included in this group, the total area being about 120 acres. The main island reaches a height of 340 feet above sea level, and is approximately 70 acres in size. It has the only major horizontal area on any of the islands in the Farallons.

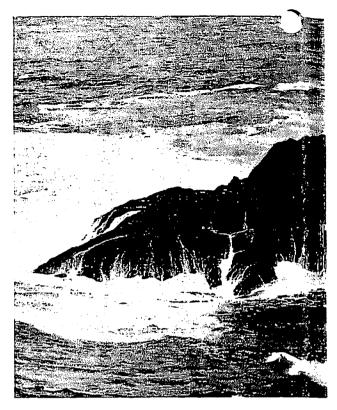
Two miles northwest is Middle Farallon, a single rock 50 yards in diameter, 20 feet high. It is frequently awash during the early summer months, and serves primarily as a resting place for cormorants and sea lions in calmer weather.

The North Farallons are four miles north, and consist of two clusters of bare, precipitous islets and rocks, extending over about one mile of ocean. They reach a height of 155 feet above sea level.

Noonday Rock is the westernmost rock, located about three miles northwest of the North Farallons. It is almost completely submerged and is awash most of the time. It's principal value, along with the surrounding Fanny Shoal, appears to be as a feeding grounds for diving birds.

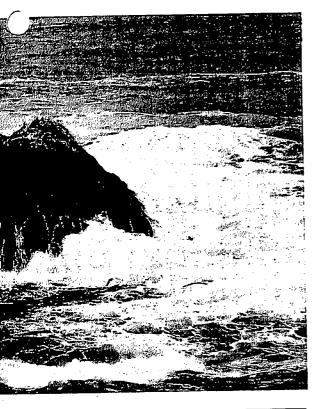
Geologically, the Farallon Islands are a granitic formation of a decomposing type. There are some pockets of shallow soil, particularly on the less vertical portions of Southeast Farallon.

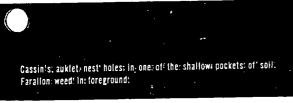
The climate is characterized by frequent strong winds and dense fog. Rainfall occurs mainly during winter, with summer moisture usually limited to damp fogs. Annual precipitation is approximately 10 inches. Temperatures are almost constant year round, seldom falling below 40°F. or rising above 60°F.



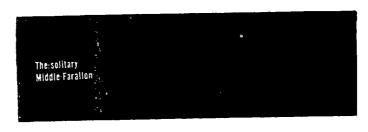












#### **RESOURCES**

Eleven species of sea birds are known to nest on the Farallons. Included are the Cassin's auklet, western gull, ashy petrel, Brandt's pelagic and double-crested cormorants, common murre, pigeon guillemot, Leach's petrel, tufted puffin and black oystercatcher.

The three species of cormorants which occur on the islands constitute the largest colony complex of cormorants in California, and possibly on the entire Pacific Coast, outside Alaska.

The islands are also home to a small nesting population of rock wrens and house sparrows. Numerous transient songbirds have been observed on Southeast Farallon and probably stop on the other islands as well.

California sea lions are the most common mammalian inhabitant of the refuge, and reportedly breed there. Steller sea lions and northern elephant seals also haul out on the rocks occasionally. European rabbits were introduced to Southeast Farallon, and a few have survived in spite of meager food supplies and periodic control.

Vegetation is sparse. Farallon weed predominates. Fourteen other native plants, 68 marine algae, and 6 lichens have been identified on Southeast Farallon, and some of these no doubt occur on certain of the other islands as well.

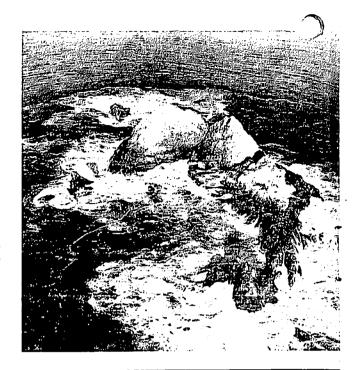
No important mineral resources are known to occur on any of the islands.

#### PUBLIC USE

Isolation and inaccessibility have kept people off the northern three island groups. These same factors, plus Coast Guard restrictions, have limited visitation to Southeast Farallon.

Bay Area chapters of the National Audubon Society sponsor annual bird-watching charter boat tour trips around the islands, and similar excursions are likely to remain the only possible type of public use.

Even if safety and distance factors were ruled out, disturbance from visits to the islands would be highly detrimental to colonial nesting seabirds.

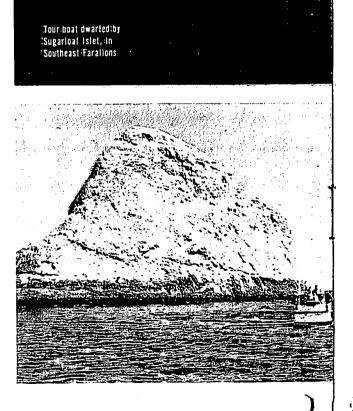


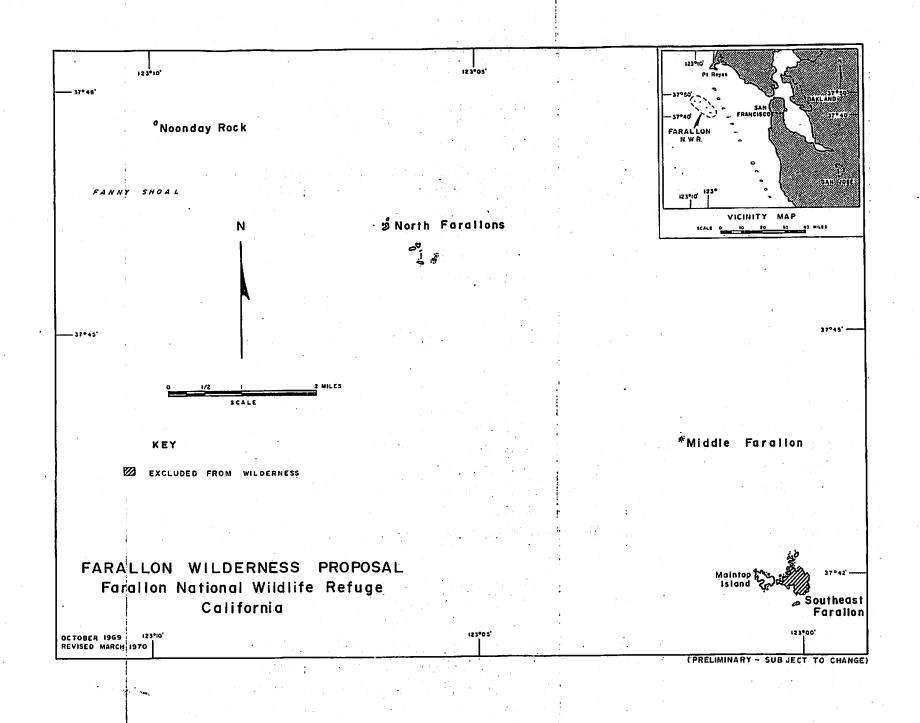
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## MANAGEMENT AND DEVELOPMENT

Wildlife management is confined to periodic inventories of wildlife resources of the islands and the accumulation of information having an influence on those resources.

No development is possible or necessary on the three northern island groups. Developments on Southeast Farallon include a lighthouse, a short trail system, several buildings and related facilities. The Coast Guard currently has personnel on the island year round. They have plans to automate the light, and, eventually, remove all resident personnel. At least some of the existing physical facilities and structures will be permanently retained.





### SOCIAL AND ECONOMIC CONSIDERATIONS

The Farallon Islands comprise an important breeding area which makes a significant contribution to the birdlife of the Pacific Coastal region. They will assume continuing importance as a rather unique attraction to people of the Bay Area megalopolis in search of meaningful diversions from an urban environment.

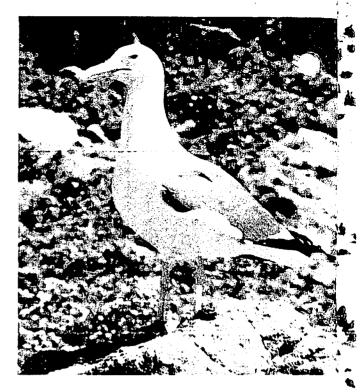
The proximity of the islands to Point Reyes Bird Observatory, San Francisco State College and other scientific and educational institutions in this area, give them importance as an outdoor laboratory providing opportunities for studies of a natural marine environment—an environment essentially unaffected by man's influence.

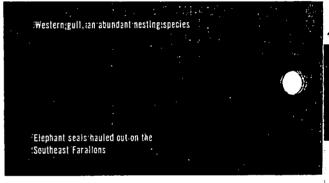
#### **CONCLUSIONS**

All of the Farallon Islands possess wilderness qualities. However, Southeast Farallon Island is not suitable for consideration at this time because of human habitation and physical improvements. The balance of the islands, comprising about 140 acres and including the small rocks and islets adjacent to Southeast Farallon Island, are suitable for consideration as wilderness.

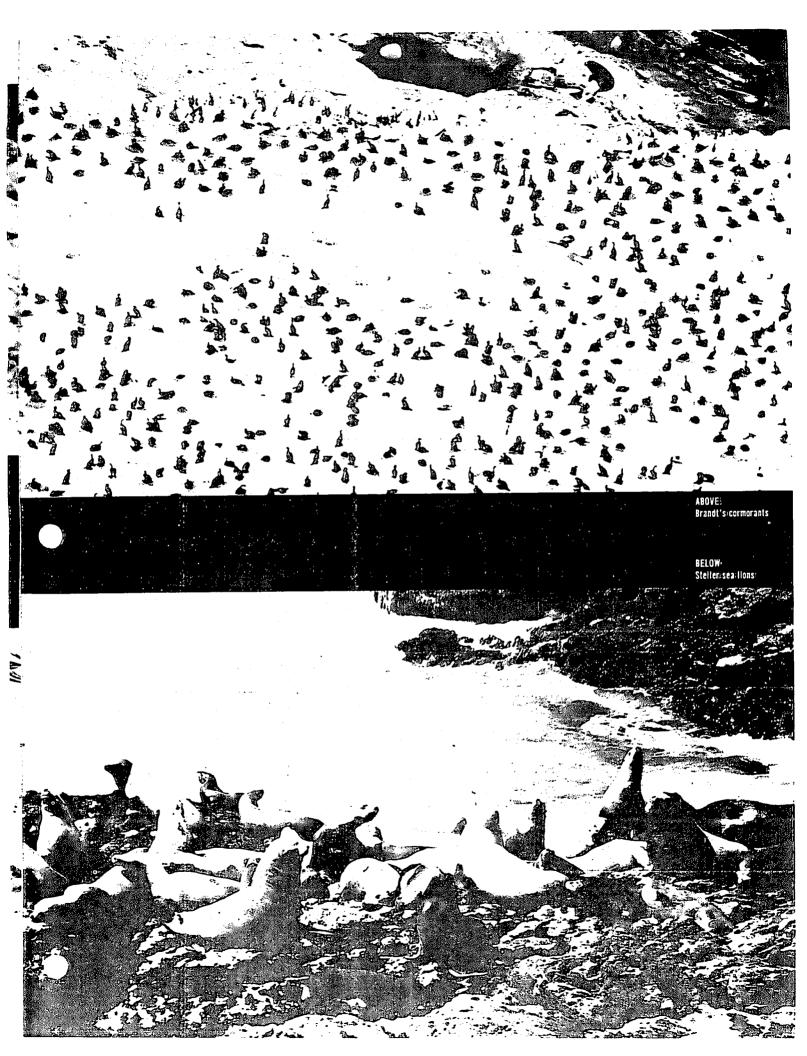
The U.S. Coast Guard is automating the navigational light on Southeast Farallon, and may remove resident personnel if the automated light works satisfactorily. If it does become possible to remove the evidence of man's occupancy (in a practical sense), then this important island will be suitable for consideration as wilderness.

Wilderness designation of the suitable portion of this refuge is entirely compatible with the purposes for which it was established, and would enhance the existing objective of preserving physical and biological qualities in a natural condition for optimum wildlife use and productivity.











As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.

#### PHOTO CREDITS

المستقدم والمنظم المنظم Cover, courtesy John V. Young; page 1, 4, 7 (upper right), courtesy U. S. Coast Guard; page 3 (upper), 5 (lower), 6, 7 (lower left), 9, 10, Richard D. Bauer; page 5 (upper), Joseph P. Mazzoni.

For more information, write Regional Director, Bureau of Sport Fisheries and Wildlife, P.O. Box 3737, Portland, Oregon 97208.



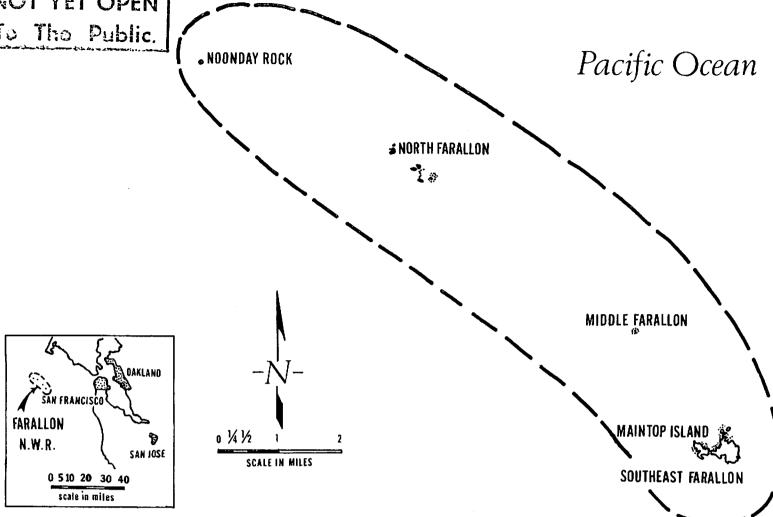
UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

Appendix 4

#### public use

This Area Is NOT YET OPEN To The Public. Ine Northern three groups are inaccessible and landing on the southern group is safe during calm seas. The human disturbance factor during the summer brooding season limits public use. Most use is restricted to observatory personnel and other researchers. Public use is not permitted.

Bay Area chapters of the National Audubon So sponsor annual bird-watching charter boat around the islands. In addition to the birds nestin the islands, other sea birds such as shearwa jaegers, and the black-footed albatross are often



# ADDITIONAL INFORMATION

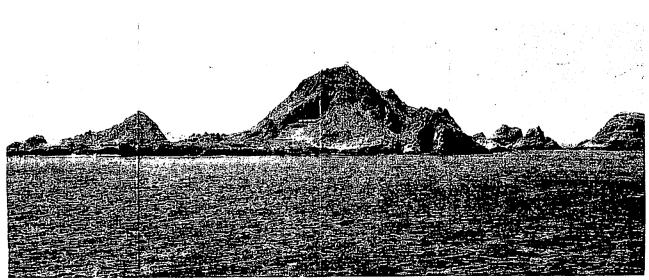
Further information concerning this unique wildlife domain can be obtained by contacting the:

San Pablo Bay National Wildlife Refuge P.O. Box 1027
823 Marin Street
Vallejo, California 94590
Vallejo, California 94590
324 PERALTA BOULEVARD
FREMONT, CA 94536

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REFUGE LEAFLET 527 — REV. MARCH 1973



## NATIONAL NILDLIFE REFUGE

naltarnia

#### description

THE NORTH FARALLONS

About 30 miles west of San Francisco, the vastness of the Pacific Ocean is interrupted by several small islands. These are the Farallons, "little pointed islets of the sea". These precipitous islets extend over a distance of eight miles.

The islands comprise the largest continental sea bird rookery south of Alaska, hosting over 200,000 birds each summer. Their value for wildlife led to the establishment of the northern three island groups as a National Wildlife Refuge in 1909. The southern island group was given refuge status in 1969 when the U.S. Coast Guard's station on Southeast Farallon was to become automated. This had been a manned station

The southern most group of islands is the largest, covering about 120 acres. The North Farallons comprise most of the remaining acreage. The total refuge area is 211 acres. Middle Farallon and Noonday Rock are large steep rocks, often awash by themot often placid Pacific.

#### history

BRANDT'S CORMORANTS AND COMMON MURRES

The first known visitor to the Farallon Islands was Jaun Rodriquez Cabrillo, who sailed along the California coast in 1539. Later, Sir Francis Drake stopped here to replenish his ship's meager larder with sea lion meat. In the late 18th and 19th centuries Americans and Russians exploited the sea lions, fur seals and sea otters then found in abundance around the islands.

During the 1850's the Farallons experienced their heaviest human pressure as a result of the phenomenal population growth that accompanied California's Gold Rush. Demand for food far exceeded normal supplies, and San Francisco markets were soon provided with millions of sea bird eggs taken from the islands. One of the "egg companies" formed during this period reputedly gathered and sold close to 4 million murre eggs between 1850 and 1856.

Competition between organized collectors and "independents" was strong, and the bird colonies were the scene of many a brawl and even a few shooting incidents. Egg collecting continued at a high level until 1890, when restrictions by the Secretary of the Interior and a declining market for murre eggs brought the Farallon "Egg Wars" to an end.



Human disturbance has been and will continue to be one of the major threats to the wildlife of the Farallons. One person walking through a cormorant or murre colony can cause complete destruction of eggs and young. As these birds are frightened from their nests the aggressive western gull is left to devour the unprotected off-spring.

NORTHERN ELEPHANT SEALS

#### the resource

Twdve Eleven species of sea birds are known to nest on the Farallons. The most conspicuous are the western gull, the Brandt's cormorant and the common murre. The most abundant is the burrow nesting Cassin's auklet whose summer population is estimated at 110,000. The other breeders include the double-crested and pelagic cormorants, pigeon guillemot, ashy petrel, Leach's petrel, tufted puffin, and the black rhinoceros auklet,

The Islands provide fall and winter homes to the endangered brown pelican and peregrine falcon. One thousand pelicans have been observed during fall periods and it is not uncommon to see two or three peregrines during the winter period.

The Farallons act as a resting or stop-over for migrating land birds. Point Reyes Bird Observatory personnel have identified over 200 species of these small birds, several of them being the first sight records





The last permanently assigned Coast Guardsman left the Southeast island in December 1972 as the last step in automating the light station.

The Bureau of Sport Fisheries and Wildlife has entered into agreements with the Coast Guard and the Point Reyes Bird Observatory to give continued protection against human disturbance and to gain additional information about the island's wildlife. The Coast Guard has transferred several island buildings to the Bureau and provides transportation to Bureau and Observatory personnel. The Observatory mans Southeast Farallon year round to ward off unauthorized human visitors as well as to take census counts and to conduct research.

The state of California gave further protection to Farallon wildlife in 1971 by including all waters within one mile of the Farallon Islands as a state refuge.

Wilderness status for the Farallons, except for Southeast Farallon, is ngressional-approval. Such classification will give additional protection.

was approved by Congress on December 26, 1974.



The Farallons are important to the well-being of three marine mammals. California and Steller sea lions are abundant yearlong with total numbers reaching nearly 1500. The northern elephant seal began using Southeast Farallon in 1967 after being absent for over 100 years. Nearly 150 animals use, the few small sandy beaches. Even more encouraging was the lattle of a single pure more that this will be the state of a single pure more breeding population for an animal that nearly become extinct not many years ago. There is nearly leading by the lattle of a single pure market of the harbor seal we being the most abundant. This plant is the main nest material used by being the most abundant. This plant is the main nest material used by

FINDING OF APPROPRIATENESS OF A REFUGE USE		
Refuge Name: Farallon NWR		
Use: Research and Monitoring		
This form is not required for wildlife-dependent recreational uses, take regulated by the described in a refuge CCP or step-down management plan approved after October 9, 1		ready
Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	<b>√</b>	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, a local)?	nd 🗸	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	• 🗸	
(d) Is the use consistent with public safety?	<b>√</b>	
(e) Is the use consistent with goals and objectives in an approved management plan odocument?	or other	
(f) Has an earlier documented analysis not denied the use or is this the first time the ubeen proposed?	se has	
(g) Is the use manageable within available budget and staff?	<b>√</b>	
(h) Will this be manageable in the future within existing resources?	<b>√</b>	
(i) Does the use contribute to the public's understanding and appreciation of the refuge natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	e's	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreatuses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	tional	
Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to found appropriate. If the answer is "no" to any of the other questions above, we will <b>gen</b>	(b), (c), or (d)) m	nay not be
If indicated, the refuge manager has consulted with State fish and wildlife agencies. Ye	s No	
When the refuge manager finds the use appropriate based on sound professional judgn must justify the use in writing on an attached sheet and obtain the refuge supervisor's c	nent, the refuge oncurrence.	manager
Based on an overall assessment of these factors, my summary conclusion is that the pr	oposed use is:	
Not Appropriate Appro	opriate	
Refuge Manager: Date:	10/1/08	
f found to be <b>Not Appropriate</b> , the refuge supervisor does not need to sign concurrence	e if the use is a	new use.
f an existing use is found <b>Not Appropriate</b> outside the CCP process, the refuge superv	risor must sign o	oncurrence
f found to be <b>Appropriate</b> , the refuge supervisor must sign concurrence.		
Refuge Supervisor: Date:		

#### Appropriate Use Justification: Research and Monitoring

Refuge staff relies heavily on partners to conduct research activities on the Refuge that we may not have the staffing, resources, or expertise to undertake. Existing and future research activities must address our management needs such that it supports the conservation of the unique habitat and wildlife on the Refuge. Research that can be done off the Refuge is generally discouraged. Researchers are also prescribed protocols to reduce disturbance on Refuge resources and habitat.

#### FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: Farallon NWR		
Use: Remote Camera Systems for Environmental Education an	d Monitoring	
This form is not required for wildlife-dependent recreational uses, take regulated by described in a refuge CCP or step-down management plan approved after October step-down management plan approved after October step-down		Iready
Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	<b>√</b>	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribalocal)?	ıl, and	
(c) Is the use consistent with applicable Executive orders and Department and Ser policies?	vice	
(d) Is the use consistent with public safety?	<b>√</b>	
(e) Is the use consistent with goals and objectives in an approved management pla document?	an or other	
(f) Has an earlier documented analysis not denied the use or is this the first time theen proposed?	e use has	
(g) Is the use manageable within available budget and staff?	<b>√</b>	
(h) Will this be manageable in the future within existing resources?	<b>√</b>	
(i) Does the use contribute to the public's understanding and appreciation of the renatural or cultural resources, or is the use beneficial to the refuge's natural or culturesources?		
(j) Can the use be accommodated without impairing existing wildlife-dependent recuses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	creational	
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If indicated, the refuge manager has consulted with State fish and wildlife agencies.	Yes No	
When the refuge manager finds the use appropriate based on sound professional ju must justify the use in writing on an attached sheet and obtain the refuge supervisor		manager
Based on an overall assessment of these factors, my summary conclusion is that the	e proposed use is:	
Not AppropriateAp	ppropriate	
Refuge Manager: Da	ate: 10/1/08	
If found to be <b>Not Appropriate</b> , the refuge supervisor does not need to sign concurr	ence if the use is a	new use.
f an existing use is found <b>Not Appropriate</b> outside the CCP process, the refuge su	pervisor must sign c	oncurrenc
If found to be Appropriate, the refuge supervisor must sign concurrence.		
Refuge Supervisor: Da	ate:	

#### Appropriate Use Justification: Remote Camera System

The remote camera system will serve the Refuge two-fold by improving management needs and expanding environmental education. A camera system will provide daily monitoring in areas where staff would like to reduce presence or where wildlife and/or habitat are sensitive to human disturbance. For example, currently data is only collected intermittently (not more than once per week during the breeding season) from seabird and pinniped populations in wilderness areas on the Refuge. Further, this information is gathered only from a distance by boat (staff do not access the wilderness areas where breeding is occurring). A camera system can provide more detailed information such as eggs per clutch or fledge rates.

Environmental education is one of the six priority public uses of the Refuge System. A camera system can also be used as a tool to connect this remote Refuge to the mainland. The real-time video and the data collected from the camera can be used in an environmental education program for local schools. This web-based system would be accessible to the public as well.

#### FINDING OF APPROPRIATENESS OF A REFUGE USE

<sub>Jse:</sub> Media Access (not more than 1-3 journalists and up to 3 v	isits per year)	
This form is not required for wildlife-dependent recreational uses, take regulated by described in a refuge CCP or step-down management plan approved after October		Iready
Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	<b>√</b>	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribalocal)?	al, and	
(c) Is the use consistent with applicable Executive orders and Department and Serpolicies?	vice	
(d) Is the use consistent with public safety?	<b>√</b>	
(e) Is the use consistent with goals and objectives in an approved management pladocument?	an or other	
(f) Has an earlier documented analysis not denied the use or is this the first time the been proposed?	ne use has	
(g) Is the use manageable within available budget and staff?	<b>√</b>	
(h) Will this be manageable in the future within existing resources?	<b>✓</b>	
(i) Does the use contribute to the public's understanding and appreciation of the renatural or cultural resources, or is the use beneficial to the refuge's natural or culturesources?		
(j) Can the use be accommodated without impairing existing wildlife-dependent recuses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	creational	
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Not Appropriate	ppropriate	
efuge Manager: Da	<sub>ate:</sub> 10/1/08	
found to be <b>Not Appropriate</b> , the refuge supervisor does not need to sign concur	rence if the use is a	new us
an existing use is found <b>Not Appropriate</b> outside the CCP process, the refuge su	pervisor must sign c	oncurre
found to be <b>Appropriate</b> , the refuge supervisor must sign concurrence.		
Refuge Supervisor: Da	ate:	

#### Appropriate Use Justification: Media Access

Media access is appropriate because it will serve as an environmental education tool that contributes to the public understanding and appreciation of the refuge's unique natural resources and cultural assets. Media access will facilitate environmental education, which is one of six priority public uses (the other uses are hunting, fishing, environmental education, and interpretation) promoted in the National Wildlife Refuge System Improvement Act of 1997. The Refuge is difficult to travel to and with limited infrastructure, can only accommodate a limited number of persons at one time. By providing media representatives supervised access to the Refuge, the staff can outreach to a larger audience.

#### Appendix J. Compatibility Determination for Research on the Farallon National Wildlife Refuge

Use: Research & Monitoring

Refuge Name: Farallon National Wildlife Refuge, San Francisco County, California

#### **Establishing and Acquisition Authority:**

Farallon National Wildlife Refuge (NWR) was established under Executive Order 1043 (February 27, 1909) and Public Land Order 4671 (June 23, 1969). The approved Refuge boundary contains 211 acres which the U.S. Fish and Wildlife Service (Service) manages in entirety.

#### **Refuge Purpose(s):**

Farallon NWR purposes include:

- "...as a preserve and breeding ground for native birds." (Executive Order 1043).
- "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." (16 U.S.C. 742f(a)(4)) and "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 U.S.C 742f(b)(1), Fish and Wildlife Act of 1956).
- "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species..." (16 U.S.C. 460k-l, Refuge Recreation Act).
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 USC 715d, Migratory Bird Conservation Act of 1918).

#### **National Wildlife Refuge System Mission:**

The mission of the National Wildlife Refuge System (System) is "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

#### **Description of Use(s):**

Existing/Ongoing

PRBO Conservation Science (formerly Point Reyes Bird Observatory) has been conducting wildlife monitoring and research on Southeast Farallon Island (SEFI) since 1969 under a cooperative agreement with the Service. PRBO activities take place year-round, on a continuing basis in conjunction with duties to care take the island and provide a human presence that deters unauthorized landings and human disturbance.

<u>Seabird Research:</u> PRBO monitors population size, breeding success and conducts other long-term population and diet studies on the 12 species of breeding seabirds on SEFI. Population information from West End is obtained from SEFI vantage points or from boats. Methods

include: 1) Population counts on or around the Refuge from ground and boat; 2) Estimates of productivity through nest monitoring, which include natural sites, boxes and other artificial habitat; 3) Re-visiting monitored breeding sites to check for eggs, hatching, weighing/measuring chicks, and banding chicks and incubating adults; 4) Searches for new breeding sites through visual scanning or tape playback; 5) Diet monitoring through visual observation from blinds, mistnetting or spotlighting, and collecting diet samples from birds; 6) Banding with aluminum, stainless steel or other approved leg bands and/or color bands adults and chicks of selected species including Ashy and Leach's storm-petrels, Cassin's and rhinoceros auklets, common murre, Brandt's cormorants, western gull, pigeon guillemot, and black oystercatcher; 7) Instruments for studying foraging distribution or dispersal patterns; 8) Mist-netting and banding of storm-petrels and rhinoceros auklets for population or diet studies; and 9) Use of burrow cameras to detect auklets and storm-petrels.

<u>Marine Mammal Research:</u> PRBO conducts weekly pinniped counts of five species year-round, throughout the South Farallon Islands. These surveys are non-disturbing, since they are conducted from blinds or high vantage points such as Lighthouse Hill. Northern fur seals are monitored by making weekly survey excursions to West End during September and October because their breeding/haul-out site cannot be viewed from SEFI or the water.

PRBO conducts more intensive research on productivity and survival of northern elephant seals. Methods include: 1) Temporarily marking cows and pups during the breeding season (December to early March) with hair dye to determine phenology and breeding success; 2) Tagging all young of the year with permanent flipper tags; 3) Weighing and measuring accessible, weaned seals on SEFI to determine general body condition; and 4) Monitoring West End breeding sites by making weekly or fewer surveys during January and February.

Non-breeding Bird Research: PRBO monitors arrivals and length of stay of landbirds and shorebirds on SEFI year-round, but intensive monitoring occurs only during fall migration. Methods include: 1) Fall daily visual surveys and timed area searches using binoculars to count and identify all species of landbirds; 2) Fall and winter daily "shorebird walks" to intertidal areas on SEFI; 3) Mistnetting and banding landbirds during migration; and 4) Maintaining daily records of all birds (and banded individuals) observed on SEFI. Banded birds are released shortly after banding. Burrowing owls captured after December 1 may be translocated to the mainland, because their food supply (non-native mice) crashes in the late-winter/early-spring resulting in unnaturally high Ashy storm-petrel predation or owl starvation. However, owls may be left on the island through winter to study overwinter survival, movement patterns, and diet.

Other PRBO Existing/Ongoing Research: PRBO conducts daily observations of white shark attacks from Lighthouse Hill September through November to estimate population size and feeding activity. PRBO also conducts surveys of several areas that are used as hoary bat roosting sites during the fall migration period (mid-August to November). Population trends of arboreal salamanders are assessed by checking auklet boxes and coverboards for the presence of salamanders every two weeks from September to March; animals are measured and toe clipped. Every living thing seen on or from the island, from butterflies to whales, is also noted and recorded in the daily journal by PRBO. PRBO also collects water samples for Scripts Institute, reports weather data to the National Weather Service (NWS), and reports sea and weather conditions to mainland fishermen and boaters.

<u>Gulf of the Farallones National Marine Sanctuary (GFNMS) Research:</u> Since 1992, GFNMS personnel have monitored intertidal species at six permanent plots on SFI, including two plots on West End. Visits for up to 4 people to collect point and photo quadrant data are authorized by Special Use Permit (SUP) three times annually [during late summer (August-September), fall (November-December), and winter (January to mid-March)]. Visits to West End are not allowed in August.

<u>University of Berkeley Research:</u> Since the early 1990s, UC Berkeley Seismology Lab has monitored movement of the Pacific Plate through two of their seismographic instruments located on the extreme eastern side of SEFI. These instruments are a unique contribution to the worldwide monitoring system of seismic activity, since the Farallon Islands are the only land mass on the eastern side of the Pacific Plate. Periodic maintenance of the instruments, which have a footprint of less than 3 square meters, is authorized by SUP generally once every 2-3 years.

<u>National Weather Service Research:</u> NWS maintains and accesses some small weather instruments (total footprint less than 5 square meters) on the Marine Terrace 1-2 times yearly by SUP. The weather data collected by these instruments is also used by PRBO and the Service for interpreting wildlife responses and research results, and island operations (i.e., making weather-based decisions for boat landings).

#### Future/Proposed

Based on past experience, we expect to receive two to four requests per year (in addition to the research conducted by the institutions identified above) to conduct research on SEFI from institutions and independent researchers. Although research is not identified as a priority public use by the National Wildlife Refuge System Improvement Act of 1997, the Act does contain a provision to "conduct inventory and monitoring." The scope of this determination includes research conducted by all agencies, individuals and institutions other than the Service.

Additional research studies may be approved by USFWS after submittal/evaluation of a research proposal. These may include blood collections from a small number of seabirds for genetics, aging, sexing, or contaminants work; egg, feather or carcass collection for contaminant studies or other wildlife health studies; diet energetics studies; foraging ecology effects of climate change; and more intensive population estimation studies of seabirds or marine mammals. We are particularly interested in increasing our knowledge of less-studied fauna including arboreal salamanders, migratory bats, insects, and invasive intertidal species. We will support and encourage these studies provided they fit the following criteria and do not detract from the main Refuge purpose of protecting seabirds and pinnipeds. We support research for threatened and endangered species when resulting information from a study outweighs the impacts from the study itself.

Generally on-site research would be limited to SEFI. Research applicants must submit a proposal that would outline: 1) study objectives; 2) justification for the study in relation to the Refuge's purpose and/or the mission of the Refuge System; 3) detailed methods and project description; 4) relationship to refuge resources, including potential impacts; 5) expected products and results; 6) timeframe, personnel required, other logistical considerations; and 7) other collaborators. Proposals would be reviewed by Refuge staff and other specialists, as appropriate. Access for all studies other than those conducted by PRBO would be authorized by SUP. Research proposed by PRBO would be authorized following provisions in the cooperative agreement: PRBO submits

annual research plans for ongoing work and research proposals for new research. These are approved by the refuge manager.

Each research proposal would be evaluated to determine its relative contribution to improved management or protection for refuge wildlife. Criteria that must be met before granting approval for a study include:

- Research must contribute to protection, enhancement or management of native Farallon wildlife populations or their habitats;
- Research that would answer a priority information or management need would have priority over other studies;
- Research must not conflict with ongoing management, monitoring, or research. Monitored populations that are used to fulfill Service requirements of estimating population size and reproductive success will not be affected by other research;
- Research that does not directly benefit Farallon resources and can be done elsewhere off-Refuge is less likely to get approved;
- Research that involves access to West End or other designated wilderness is not likely to get approved;
- Research which causes undue disturbance that is intrusive or manipulative would be discouraged. All requests would be carefully considered because most seabirds and marine mammals are very sensitive to disturbance, and soil habitats that support burrowing seabirds are prone to burrow crushing and compaction.
- Every effort must be made to minimize disturbance to wildlife and habitat through study design, including adjusting timing, number of study sites, location, scope, number of permittees, etc. Consideration would be given to whether existing island staff can collect data or samples, thereby avoiding the need for additional people.
- Existing staffing and island resources (e.g., water supplies, power, transportation and other logistics) must be available to monitor and support the research.
- The length of the project would be considered and agreed upon before approval. Projects would not be open-ended, and at minimum, would be reviewed annually.
- Researchers would be required to submit a report, including interim reports if applicable, and credit the Refuge in any reports or publications.

#### **Availability of Resources:**

Research proposals would be approved contingent upon adequate funding and staff to oversee projects. Oversight and review of PRBO and independent researcher proposals, study plans, and report takes an estimated .10 FTE annually. The cost per year is \$11,875 based on the fiscal year 2007 pay scale of a GS-12 (with San Francisco locality pay adjustment).

#### **Anticipated Impacts of the Use(s):**

Scientific research can benefit Refuge resources and support the purposes of the Refuge and mission of the System. Monitoring is an important component of adaptive management. PRBO's monitoring and research provides essential information on population levels and breeding success of most seabirds and marine mammals. Information is summarized in annual and monthly reports. Population demography and food habit studies provide information useful in assessing the status and trends of a particular species. Biological research/monitoring data, combined with information on weather, sea conditions (including food availability), and human disturbance can lead to conservation efforts to protect species. For example, diet studies and documented seabird

impacts from commercial fishing have led to gill net and other regulations that have reduced seabird mortality. Monitoring and collection of oiled wildlife has led to the identification and clean-up of sources of petroleum spills/leaks. PRBO also monitors for sources of human disturbance, such as boats approaching too close to the shoreline or aircraft flying too low. They either immediately intervene to stop the disturbance or report it to Refuge law enforcement staff who issue a warning or citation. Overall benefits of PRBO's researchers on the island outweigh impacts summarized above.

Monitoring and research causes minimal impacts when conducted from blinds or remote vantage points. Individual seabirds are temporarily disturbed during nest checks, mistnetting, banding, or diet sample collections. Elephant seals are temporarily disturbed during tagging and marking. Access to West End can flush marine mammals, common murres or Brandt's cormorants. Human traffic increases during the seabird nesting season because more researchers are present April through August. Potential impacts include flushing of birds from breeding sites, increasing vulnerability of eggs or chicks to western gull predation, crushing of Cassin's auklet burrows by trampling, depriving chicks of a single meal to obtain diet samples, or in the most intrusive studies, affecting the productivity of a low number of individuals in a single breeding season.

Some level of disturbance is also expected from research activities conducted by institutions/independent researchers other than PRBO because they could occur in sensitive areas, during sensitive time periods, and may involve collecting samples or handling wildlife. Travel to West End has the potential for flushing Steller's sea lions and common murres, and introducing weed seeds. However, minimal impact to Refuge resources are anticipated since research studies would be carefully screened before issuing a SUP and contain conditions to minimize disturbance to wildlife and habitat. Based on past experience, independent research is expected to have conservation benefits to Farallon wildlife in the long term that outweighs short-term impacts. For example, data collected on hoary bats has led to a better understanding of migratory patterns and identified possible impacts of mainland wind turbines.

#### **Public Review and Comment:**

Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for Farallon NWR, released in December 2008. No comments were made directly in regard to the compatibility determinations. All comments received were addressed in Response to Comments (Appendix P).

Determination (check one below):			
	Use is Not Compatible		
<u>X</u>	Use is Compatible with the Following Stipulations		

#### **Stipulations Necessary to Ensure Compatibility:**

The following stipulations would be followed in order to minimize the impacts of research/monitoring by PRBO (incorporated in the cooperative agreement) or others (through SUP Special Conditions) granted access for studies.

- Human traffic is only allowed on specific walkways and a small portion of the Refuge (see Figure 1, Closure Areas Map) during the seabird breeding season beginning March 15 and ending August 15 (these dates may be modified as needed).
- The north side of Lighthouse Hill on SEFI, islets surrounding SEFI, Middle Farallons, and North Farallons are closed to research. Mussel Flat is closed except for sampling inter-tidal plots.
- Limit research access to West End to those surveys needed to assess pinniped population levels, pup numbers, and behavioral data: six visits between September and October to assess the expanding fur seal colony, and six visits between January and February to monitor elephant seals.
- The West End Wilderness Area is closed from March 1 to August 31. No more than six visits between September and October will be allowed to monitor fur seal populations and no more than six visits between January and February will be allowed to monitor elephant seals. GFNMS intertidal monitoring must be combined with one of these visits. No flushing of murres or Steller's sea lions is allowed. All visitors to West End will engage in phyto-sanitation procedures: rubber boots, freshly rinsed in bleach water, will be worn and all outerwear shall be brushed free of seeds prior to accessing West End.
- The trail between the weather station and Sand Flat will be closed on April 15, and not reopened until foot traffic can take place without disturbing cormorants. The timing of closures for this and other trails will be periodically re-evaluated to determine if additional closures are needed to protect nesting seabirds or marine mammals.
- The maximum number of overnight researchers (which includes PRBO staff and interns) is 8.
- Independent researchers will be scheduled outside of the seabird breeding season whenever possible.
- PRBO and research permittees are required to minimize disturbance to seabirds, other wildlife, and habitat whenever possible.
- Mistnetting and banding locations are limited to existing paths and boardwalks in order to minimize disturbance.
- PRBO and independent researchers are responsible for maintaining all permits necessary, including migratory bird and incidental harassment to pinnipeds.
- The Service and PRBO will hold an annual meeting to discuss all issues, including disturbance concerns. Other stakeholders such as collaborating partners may be included. If research or monitoring studies are adversely affecting Refuge resources, the activity will be modified or stopped to avoid impacts.
- PRBO is required to train all new volunteers on Refuge restrictions and procedures.
- Crushing of nesting burrows is prohibited. If accidentally damaged, they are to be reported and repaired immediately.
- All research permittees will be under the direct guidance of the PRBO biologist-in-charge or a Service staff person, who is authorized to stop or reduce the permitted activity if to continue the activity would cause undue disturbance to wildlife, habitat, compromise other refuge purposes, or endanger human safety.
- Highly intrusive or manipulative research is generally not permitted, in order to protect
  depleted native bird populations and allow them to recover from historic human impacts.
- All visitors, including refuge staff, PRBO staff and interns, will be required to engage in phyto-sanitation procedures that will limit transport of non-native species onto the Refuge.

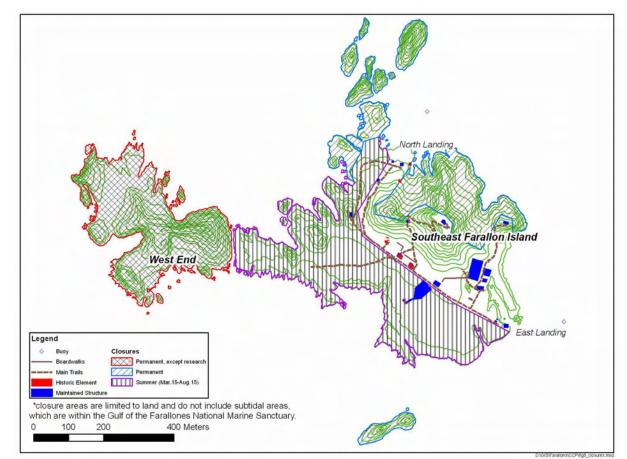


Figure 1. South Farallon Islands Closure Areas

#### **Justification:**

Well-defined research projects developed in consultation with Service staff, would contribute directly to the conservation, enhancement, protection, and management of native Refuge wildlife and their habitats. On the other hand, human activity from monitoring and research activities causes wildlife disturbance. When the Refuge field station was established in 1969, we acquired a site heavily impacted by continuous human occupation by individuals fulfilling missions other than protection and management of wildlife. In order to reverse the long history of human disturbance and minimize impacts of humans living on the island, we have had a policy of non-manipulative and non-intrusive research/monitoring, and limited access, to give populations the greatest chance to recover. West End is managed much more strictly than is required by its Wilderness Area designation, as a wildlife sanctuary that is primarily free even from research and management impacts.

Our policy of minimizing disturbance has had desired results. In the last decade, breeding populations of common murres have more than tripled and northern fur seals have re-colonized as a breeding species. In fact, seabirds are expanding into certain areas such as Mirounga Beach and Sea Lion Cove causing us to limit or screen our activities further. We are closing the Sand Flat trail earlier in the breeding season, and building a rock wall near "the gap" on North Landing Trail to screen human foot traffic from incipient breeding colonies.

The use described here continues the past policy with two exceptions: 1) Additional visits would be allowed to West End during September and October to monitor fur seals, and 2) Studies on lesser-understood fauna such as salamanders, bats, and insects would be encouraged. The growing fur seal colony cannot be tracked in any other way because it is not visible from SEFI vantage points or the water. We are just beginning to learn that the Farallon Islands may play an important role in conservation of hoary bats, because it is the only place where they can be studied with any regularity during migration, and migrating bat populations may be threatened by wind power development.

Conditions in Cooperative Agreements and SUP for research projects will ensure that short- and long-term impacts on Refuge resources are minimized. Based on the above described biological impacts and the stipulations, I determined that the research and monitoring activities as described above will not materially interfere with or detract from the purposes of the Farallon National Wildlife Refuge or the mission of Refuge System.

Mandatory Reevaluation Date (provide year):

	-	1 ,	
N	Iandatory 15-	year Reevaluation Date (for priority public uses	)
_X_ N	Iandatory 10-	year Reevaluation Date (for all uses other than 1	priority public uses)
NEPA C	ompliance fo	or Refuge Use Decision (check one below):	•
C	ategorical Ex	clusion without Environmental Action Statemer	nt
C	ategorical Ex	clusion and Environmental Action Statement	
_X_ E	Invironmental	Assessment and Finding of No Significant Impa	act
E	nvironmental	Impact Statement and Record of Decision	
Refuge I	Determinatio	n /	
Prepared	by:	(Signature)	9/2/09 (Date)
Project L Approval		(Signature) Stewart	9/2/09 (Date)
<u>Concurre</u> Refuge S	<u>nce</u> upervisor:	OonWahn African (Signature)	10/26/09 (Date)
Assistant Director,	Regional Refuges:	Margaret J. Kalar	10/29/09
		(Signature)	(Date)

#### Appendix K. Compatibility Determination Environmental Education and Monitoring on the Farallon National Wildlife Refuge

Use: Real-time Remote Camera Systems for Environmental Education and Monitoring

Refuge Name: Farallon National Wildlife Refuge, San Francisco County, California

#### **Establishing and Acquisition Authority:**

Farallon National Wildlife Refuge (NWR) was established under Executive Order 1043 (February 27, 1909) and Public Land Order 4671 (June 23, 1969). The approved Refuge boundary contains 211 acres which the U.S. Fish and Wildlife Service (Service) manages in entirety.

#### **Refuge Purpose(s):**

Farallon NWR purposes include:

- "...as a preserve and breeding ground for native birds." (Executive Order 1043).
- "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." (16 U.S.C. 742f(a)(4)) and "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 U.S.C 742f(b)(1), Fish and Wildlife Act of 1956).
- "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species..." (16 U.S.C. 460k-l, Refuge Recreation Act).
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 USC 715d, Migratory Bird Conservation Act of 1918).

#### **National Wildlife Refuge System Mission:**

The mission of the National Wildlife Refuge System (System) is "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

#### **Description of Use:**

Environmental education, interpretation, wildlife observation, and photography are priority, compatible public uses of the National Wildlife Refuge System. A real-time camera system would provide an opportunity for the public to observe wildlife and participate in environmental education activities off the Refuge. The camera system would also allow the Service to monitor species close up in areas where monitoring would not normally be possible due to the sensitivity of wildlife.

As proposed, a camera system would be installed prior to the breeding season at locations that are difficult to access by foot during the breeding season. The system would not be accessed during the breeding season in order to reduce disturbance to wildlife and will be removed after the breeding season. The camera system would be linked to the Refuge website and a mainland visitor center for public viewing, in addition to being available over the Internet. This use would facilitate monitoring efforts of wildlife on the Refuge.

The Refuge is also proposing this use to promote compatible wildlife observation and environmental education. Access to the island is unpredictable and hazardous; furthermore, access can result in disturbance to wildlife, damage to wildlife habitat, or introduction of non-native species. By providing the public with an opportunity to view the Refuge, awareness of and appreciation for this remote natural resource will be increased.

#### **Availability of Resources:**

A camera system, internet connection, and maintenance of this system are necessary to support this use. Installation and any needed repairs will be conducted by the camera system outfitter. Costs to administer this proposed use are staff time and operational costs. Adequate staff and funds are not available to provide this use with the current budget, but funding partners will be sought.

Materials and maintenance costs:

	One-Time Costs	Annual Costs
Camera system and installation	\$ 50,000 (2006 estimate)	\$ 9,000
Salary- Wildlife Refuge Specialist	\$ 5,000	\$ 5,000
Salary- Refuge Manager	\$ 5,000	\$ 3,000
TOTAL	\$ 60,000	\$ 17,000

#### **Anticipated Impacts of the Use:**

This use is intended to garner and maintain public support for preservation and protection of the wildlife and plant species on the Refuge. However, breeding and nesting birds tend to be very sensitive to human disturbance, whether from scientific research, recreation or ecotourism. Studies have shown that scientific research can have major impacts, causing nest abandonment (Anderson and Keith 1980), increased depredation (Tremblay and Ellison 1979), fewer nests near active areas (Burger and Gochfeld 1993), lower productivity (Anderson and Keith 1980), and increased flight (Erwin 1989). Wildlife on and surrounding the Refuge may incur temporary disturbance from the installation of the camera system, but should not be impacted during the sensitive breeding season. The camera system will require a small amount of habitat, but will not be located on a nesting or pupping site. The wildlife is expected to acclimate to the passive equipment as experienced at other wildlife sites such as the Common Murre Restoration Program in central California.

#### **Public Review and Comment:**

Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for Farallon NWR, released in December 2008. No comments were made directly in regard to the

compatibility determinations. All comments received were addressed in Response to Comments (Appendix P).
Determination:
Use is Not Compatible
$\underline{X}$ Use is Compatible with the Following Stipulations
Stipulations Necessary to Ensure Compatibility:  The wildlife populations will continue to be monitored. In fact, the camera system itself will be used as a monitoring tool and increase our ability to detect disturbance to wildlife in remote portions of the Refuge that cannot be viewed from land vantage points. Declines in wildlife populations or negative responses that can be attributed to the camera system will result in review and potential modification of this use on the Refuge. Should the system fail during the breeding season, access or repairs will not likely be made until after the breeding season.
If installed on West End, a designated Wilderness area, the system will not be maintained or accessed between March 15 and August 31. Steller sea lions and common murres must not be flushed when traveling to West End.
Installation of a camera system on West End or other "closed" or restricted access areas will require that all personnel engage in phyto-sanitation procedures: Rubber boots, freshly rinsed in bleach water, will be worn and all outerwear shall be brushed free of seeds.
Justification: Conducted with aforementioned stipulations the proposed use will likely enhance the ability of the Refuge to fulfill the Refuge System mission and the purpose of the Refuge by providing the opportunity for remote wildlife observation to the public. The Refuge would remain closed to protect the sensitive wildlife and habitat while the use would increase public awareness of the Refuge and its resources.
Based on the above described biological impacts and the stipulations, I determined that a remote camera system as described above will not materially interfere with or detract from the purposes of the Farallon National Wildlife Refuge or the mission of Refuge System.
Mandatory Re-Evaluation Date:
$\underline{X}$ Mandatory 15-year Re-Evaluation Date (for priority public uses)

Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

\_\_\_\_\_ Categorical Exclusion without Environmental Action Statement

Categorical	Exclusion and Environmental Action Statement			
_X_ Environmen	_X_ Environmental Assessment and Finding of No Significant Impact			
Environmen	tal Impact Statement and Record of Decision			
Reference Cited:				
	J.O. Keith. 1980. The human influence on seabird rations. Biological Conservation 18: 65-80.	esting success:		
Burger, J. and M. Go masked, red-footed a 20:255-259.	ochfeld. 1993. Tourism and short-term behavioral read blue-footed boobies in the Galapagos. Environm	esponses of nesting ental Conservation		
Erwin, R.M. 1989. I results and managen	Responses to human intruders by birds nesting in col- nent guidelines. Colonial Waterbirds 12:104-108.	lonies: experimental		
Tremblay, J. and L.N. Ellison. 1979. Effect of human disturbance on breeding of Black-Crowned Night Herons. Auk 96:364-369.				
Refuge Determinati	ion			
Prepared by:	(Signature)	9/2/09 (Date)		
Project Leader Approval:	(Signature)	9/2/09 (Date)		
Concurrence Refuge Supervisor:	Dan Walmath (Signature)	10/26/09 (Date)		
Assistant Regional Director, Refuges:	Margarit . Colar	10/29/09		

Compatibility Determination for Remote Camera for Environmental Education and Monitoring (Farallon)

#### Appendix L. Compatibility Determination for Media Access on the Farallon National Wildlife Refuge

Use: Media Access

Refuge Name: Farallon National Wildlife Refuge, San Francisco County, California

#### **Establishing and Acquisition Authority:**

Farallon National Wildlife Refuge (NWR) was established under Executive Order 1043 (February 27, 1909) and Public Land Order 4671 (June 23, 1969). The approved Refuge boundary contains 211 acres which the U.S. Fish and Wildlife Service (Service) manages in entirety.

#### **Refuge Purpose(s):**

Farallon NWR purposes include:

- "...as a preserve and breeding ground for native birds." (Executive Order 1043).
- "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." ((16 U.S.C. 742f(a)(4)) and "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 U.S.C 742f(b)(1), Fish and Wildlife Act of 1956).
- "...suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species..." (16 U.S.C. 460k-l, Refuge Recreation Act).
- "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 USC 715d, Migratory Bird Conservation Act of 1918).

#### **National Wildlife Refuge System Mission:**

The mission of the National Wildlife Refuge System (System) is "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

#### **Description of Use(s):**

Allow limited access to Southeast Farallon Island for media personnel in order to further public education and provide outreach opportunities. Media personnel are defined as journalists and associated photographers working for an established newspaper, magazine, journal, publication, radio or television station, or other broadcaster (other than free-lance journalists). Media visits would occur in one of three ways, listed in order of most common (or preferred) to least common:

1. Day-use visit by 1-3 individuals representing a single media entity. These would be

- authorized under a Refuge Special Use Permit (SUP) evaluated on a case-by-case basis, preceded by a written request that included their affiliation, purpose, general focus of their story, transportation arrangements, and other pertinent details
- 2. Multi-day visit by 1-3 individuals representing a single media entity. Authorized as above
- 3. One-day group media tours organized and supervised by refuge staff.

#### Media visits must meet the following criteria:

- The visit would result in a published or broadcast story that would educate the public about the Farallon Islands' wildlife and habitat, conservation, management of its resources, or the importance of the Refuge. Other important messages include the Service's role in protecting this unique public land, how the Farallon Islands fit into a national system of wildlife refuges, and the importance of partnerships with PRBO Conservation Science (PRBO) and others in managing wildlife resources and protecting habitats. Copies of broadcasted or printed stories must be provided to the Service.
- Any story resulting from the visit will state that the Farallon Islands is a National Wildlife Refuge managed by the Service.
- The visit would not conflict with other ongoing management, monitoring, research programs, or media visits.
- The visit could be monitored by the Refuge within existing staffing or logistical constraints.
- Transportation between the mainland and the island would be on a scheduled boat trip (either Farallon Patrol, or Refuge boat chartered for operational activities or a media tour). In certain situations, media may be allowed to charter their own boat, but only when an "extra boat day" could be accommodated by island staff without impacting other ongoing projects and operational activities.
- Visitors must be employed by a print or broadcast media entity. Free-lancers that are formally affiliated with a journal, newspaper, magazine, radio/TV station, etc. may be provided a one-day visit if they are "on-assignment" and/or have some other written agreement with a media entity or institution involved with public education, and their communication will be for the public and not strictly for individual sale.
- The visit will not result in damage to habitat or undue disturbance to wildlife.
- The visit can be accommodated safely, which means that certain weather/sea conditions or facilities circumstances (e.g., boats or equipment breakdowns) may result in a denial or cancellation of an approved request.

#### In addition, multi-day visits must meet the following criteria:

- The project will educate a national (or broader) audience about Farallon resources.
- There is a compelling reason why the media objectives cannot be accomplished in a
  one-day visit. Examples of reasons include: unfavorable weather patterns during
  a particular time of year may require longer than a one-day window to assure
  favorable photographic conditions or; reporting on a particular wildlife behavior
  may require sufficient observation time for the behavior to occur or; some wildlife

- are only observable at night, dawn, or dusk.
- No more than one multi-day permit will be issued per calendar year. Because of this limit, a proposal that otherwise meets the above criteria may be denied or postponed to a later year in order to achieve a balance of stories. For example, if several multi-day visits have focused on pinnipeds, the next pinniped-related request may be denied to provide the opportunity for a different subject.

Media access requests would be reviewed by the refuge manager, and other specialists as appropriate to see if it met the above criteria. This evaluation includes coordinating with PRBO island staff to judge the sensitivity of island wildlife/habitat and availability of resources to support the visit, including having sufficient personnel to escort and monitor visitors. The refuge manager would draft the SUP and discuss with the applicant the level of physical ability needed to safely get onto the island and rules a visitor(s) would be required to abide by to protect Refuge wildlife and habitat. Only after the refuge manager feels secure that the applicant understood and agreed to the conditions, which include being escorted and supervised by island staff, would a SUP be issued. The SUP would include conditions to minimize resource impacts and insure compatibility (see stipulations below). Visitors would be required to take measures to ensure that they don't bring nonnative seeds or plants to the island. The permittee signs the SUP, and the conditions are therefore enforceable by citation. Once on the island, the visitor(s) would be accompanied by a PRBO or FWS staff person who would assure that purposes of the visit were achieved safely without compromising wildlife, habitat or other operations.

# **Availability of Resources:**

Adequate funding and staff exist to manage this use at the Farallon National Wildlife Refuge.

Materials and maintenance costs:

	Annual Costs
Salary- Outdoor	\$ 2,200 (2007 dollars)
Recreation Specialist	
Salary- Refuge Manager	\$ 5,000
Per Diem	\$ 1,000
TOTAL	\$ 8,200

### **Anticipated Impacts of the Use(s):**

The Refuge is closed to public use to protect seabird and pinniped populations from human disturbance. Visitor disturbance has been shown to reduce hatching success, cause population declines and preclude nesting in certain locations by gulls and terns (Carney and Sydeman 1999). Past human use on Southeast Farallon Island severely decreased seabird and marine mammal populations, extirpating some species (Ainley and Boekelhide 1990). Breeding populations have taken decades, or in the case of elephant seals and northern fur seals over a century to recover, and many species are still much lower than they were historically. Visits during the seabird breeding season (March 15 to August 15) have the most potential for causing impacts because this is the time period when the largest numbers of seabirds are present on the island. Seabird nesting occurs on virtually every square foot of Southeast Farallon Island during the breeding season; therefore

human transit anywhere on the island has the potential to flush birds from their nests. Flushing disturbance causes the greatest impacts to colonial nesting species such as common murres. When flushed from their nests, murres leave eggs and chicks exposed to predators (mainly gulls). Repeated flushing can lead to abandonment of the nest, or if it occurs year after year, abandonment of the entire colony.

The island is mostly exposed granite rock. Soil deep enough for burrowing seabirds (rhinoceros and Cassin's auklets) to construct burrows is rare and limited to flat areas of the Marine Terrace. Human foot traffic anywhere on the Marine Terrace can crush burrows. During the breeding season, this can lead to the death of an individual bird or the loss of its reproductive effort for the year. Even during the non-breeding season, crushing a burrow can result in extra energy expenditure for the bird to dig a new burrow, since auklets re-use burrows from year to year.

Walking too close to groups of seals or sea lions that are hauled up on the shoreline can cause them to stampede into the water. This results in extra energy expenditure, and can cause injury to young animals (crushing). Steller's sea lion, listed as a threatened species, is one of the species that could be impacted by a flushing event.

Generally, between three and six media requests per year are received by the refuge manager per year. Approximately half do not meet the criteria listed above and are denied. Therefore, it is estimated that 1-3 media visits would occur during any calendar year. Based on our experience in accommodating a similar intensity of visits over the past 20 years, we anticipate that most of the impacts to wildlife and habitat described above could be avoided. Media visitors would remain on paths that are screened from colonial nesting species and pinniped haul-outs, and where other species have become habituated to people walking. They would be escorted by staff familiar with sensitive areas who are trained to read behaviors that signal when an animal becomes nervous or disturbed (seabirds and marine mammals generally exhibit certain subtle behaviors before they flush).

An exception would be the gulls nesting or roosting immediately adjacent to the island's paths. They will be flushed by the media visits, but these flushing events are not expected to result in predation or abandonment of nests. Likewise, pinnipeds (primarily California sea lions) hauled-out near the boat landing(s) will be temporarily disturbed by the transfer of visitors to SEFI.

#### Public Review and Comment:

**Determination (check one below):** 

Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for Farallon NWR, released in December 2008. No comments were made directly in regard to the compatibility determinations. All comments received were addressed in Response to Comments (Appendix P).

	Use is Not Compatible
X	Use is Compatible with Following Stipulations

### **Stipulations Necessary to Ensure Compatibility:**

The following will avoid or minimize all wildlife disturbances, and will be included as stipulations to the SUP when appropriate:

- 1. Request for media access must be submitted in a letter or proposal and will describe the specific activity and specific tie to the Farallon NWR.
- 2. Media visits will be scheduled outside of the seabird breeding season whenever possible.
- 3. Visits will be conducted in a way that minimizes disturbance to wildlife and habitat and does not cause flushing of seabirds or pinnipeds.
- 4. Media visitors must stay on existing paths and walkways on Southeast Farallon Island. Access to closed or restricted areas, including West End, will not be allowed.
- 5. Visitors will be under the direct supervision of either a Service staff person or the PRBO biologist-in-charge at all times, who may limit access, stop, or reduce the permitted activity in order to minimize wildlife disturbance.
- 6. Access to SEFI will be by boat and arranged by the permittee.
- 7. Visitors will be required to comply with phyto-sanitation procedures to reduce the introduction and spread of non-native plants.
- 8. No more than one multi-day (overnight) visit will be allowed per year.
- 9. Media visits will be allowed under a special use permit which will contain special conditions to minimize disturbance to wildlife and habitat.

#### **Justification:**

Although media access is not identified as a priority public use by the National Wildlife Refuge System Improvement Act of 1997, media access can benefit Refuge resources and support the purposes of the Refuge and mission of the System by acting as a vehicle for outreach, education, and interpretation of such a remote Refuge. Media visits have been allowed when requested, on the Farallons for more than 20 years under well-developed visitation protocols.

Numerous excellent articles and broadcasts have been done on the Refuge, including many that were in-depth pieces on conservation issues and wildlife stories unique to this Refuge. Literally millions of people, including local, national, and international audiences, have been reached by media stories. Recent print media that have featured articles on the Farallons (with circulation in parentheses) are: Los Angeles Times (815,723), San Francisco Chronicle (386,564), and Sacramento Bee (279,032). Broadcast media has included PBS, BBC, Discovery Channel, Animal Planet, and all major Bay Area television news programs. Media coverage has fostered appreciation of Farallon wildlife by the public, as evidenced by the public opposition received in response to a Congressional proposal in 2005 that would have opened the Refuge to limited public access.

Several aspects of the Refuge make it unique in being able to tell a one-of-a-kind success story of the Refuge System: 1) it is the largest seabird breeding colony in the continental United States; 2) its history of past human exploitation and recovery of wildlife populations after protection sends a positive conservation message; 3) Southeast Farallon Island has infrastructure to land and support members of the media; 4) wildlife observation blinds allow close-up photography of seabirds without causing disturbance.

On the other hand, a significant effort is required to support a single media visit. A SUP must be issued, conditions of the permit discussed with the media representative and agreed upon, advice given on what to expect and conditions of travel, transportation arranged and rescheduled if the boat is canceled. In addition, a full day of time by all personnel on the Refuge to accomplish a "boat day", including a PRBO biologist staff person to transport media personnel on and off the island and host/escort them while they are on the island, (occasionally, depending on profile of the visit), and a FWS staff person to accompany media personnel from mainland to island and throughout the entire visit.

The above criteria were arrived at to allow a level of use that can be supported by refuge resources and staff. Freelance requests are not granted due the volume of commercial requests that would be received if freelancers knew of this opportunity, the difficulty in trying to apply such access fairly, the uncertainty that freelance visits would result in a story, and because it seems unfair to allow a commercial use of closed public land that has such limited access.

The above-described media policy has been in operation on the Refuge for at least 20 years with very minimal impacts to Refuge resources. The only documented impacts have been the crushing of a western gull nest, flushing of western gulls along the paths, and flushing of California sea lions during the boat landing. Collapse of a few auklet burrows is also expected to have occurred. These minor negative impacts are a worthwhile trade-off for informing the public about unique resources and scientific discoveries on the Farallon Islands, and thereby fostering appreciation and support of this Refuge and the Refuge System.

Based on the above described biological impacts and the stipulations, I determined that media activity (one-day requests, multi-day requests, and group media tours) as described above will not materially interfere with or detract from the purposes of the Farallon National Wildlife Refuge or the mission of Refuge System.

Manda	atory Re-Evaluation Date (provide month and year for "allowed" uses only):
	Mandatory 15-year Re-Evaluation Date (for priority public uses)
<u>X</u> uses)	Mandatory 10-year Re-Evaluation Date (for all uses other than priority public
NEPA	Compliance for Refuge Use Decision (check one below):
	Categorical Exclusion without Environmental Action Statement
	Categorical Exclusion and Environmental Action Statement
_X_	Environmental Assessment and Finding of No Significant Impact
	Environmental Impact Statement and Record of Decision

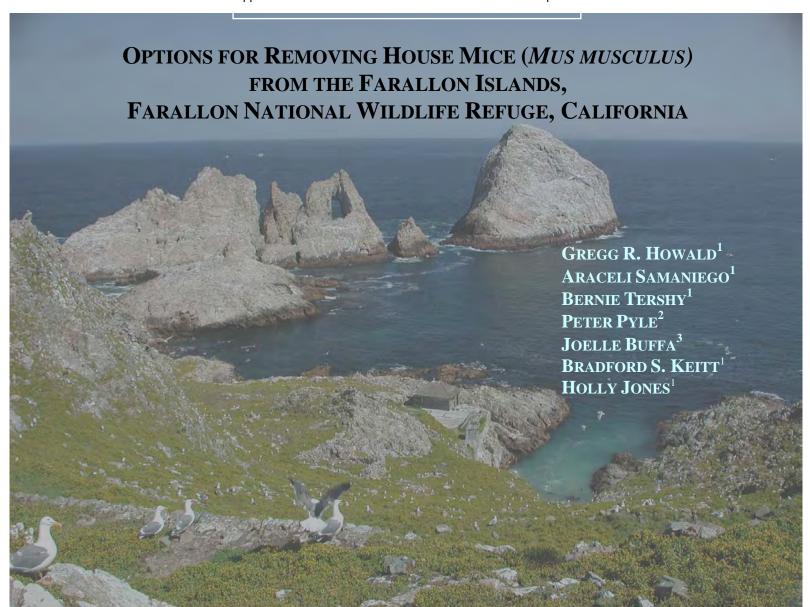
# **Literature Cited:**

Ainley, D.C. and R.J. Bockelheide. 1990. Seabirds of the Farallon Islands: Ecology, Dynamics, and Structure of an Upwelling-System Community. Stanford Univ. Press, Stanford, CA.

Carney, K.M. and W.J. Sydeman. 1999. A review of human disturbance effects on nesting colonial waterbirds. Waterbirds 22:68-79.

Refuge Determinat	ion	
Prepared by:	(Signature)	$\frac{9/2}{\text{(Date)}}$
Project Leader Approval:	(Signature) Stewart	9/2/09 (Date)
Concurrence Refuge Supervisor:	Oan Wahwatt (Signature)	10/24/09 (Date)
Assistant Regional, Director, Refuges:	Manuel Valar (Signature)	10/29/09 (Date)

Compatibility Determination for Media Access (Farallon)



- 1. ISLAND CONSERVATION AND ECOLOGY GROUP, 100 SHAFFER RD., SANTA CRUZ, CALIFORNIA, 95060.
- 2. POINT REYES BIRD OBSERVATORY,
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### **BACKGROUND INFORMATION**

#### INTRODUCED SPECIES AND IMPORTANCE OF ISLAND ECOSYSTEMS

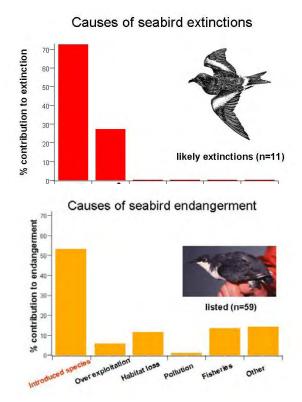
Island ecosystems, like the Farallon Islands (managed by the US Fish and Wildlife Service as the Farallon National Wildlife Refuge), are key areas for conservation because they are critical habitat for seabirds and pinnipeds that spend most of their lives in the open ocean, but depend on islands for breeding and resting. In addition, islands are rich in endemic species (islands make up about 3% of the earth's surface, but are home to 15-20% of all plant, reptile, and bird species).

Unfortunately, islands have been disproportionately impacted by humans. Approximately 70% of recorded animal extinctions have occurred on islands, and most of these extinctions, including more than half of all seabird extinctions, were caused by invasive species (Fig.1a).

Today, more than half of all IUCN red listed birds are threatened by introduced species (Fig. 1b). Feral cats and rodents are the most devastating introduced species to island ecosystems, where they frequently impact native species through direct predation, competition or changes in the food web. House mice have been introduced onto islands worldwide, causing ecosystem-wide perturbations, including profound effects on the distribution and abundance of native flora and fauna (eg. Crafford and Scholtz 1987; Crafford 1990; Copson 1986).



The house mouse (Mus musculus) is among the



**Figure 1**. Causes of seabird extinction (a) and endangerment (b) based on IUCN global red list data.

most widespread of all mammals, a result of its close association with humans and the relative ease with which it can be transported and introduced to new locations. House mice are among the vertebrates considered to be "significant invasive species" on islands of the South Pacific and Hawaii, having probably reached all inhabited islands in the Pacific as well as some uninhabited islands (Atkinson and Atkinson 2000). The resourcefulness of house mice is evident from their global distribution and their broad habitat range including buildings, agricultural land, coastal regions, grasslands, salt marshes, deserts, forests and subantartic areas (Efford *et al.* 1988, Triggs 1991 and Atkinson and Atkinson 2000).

#### IMPACTS OF HOUSE MICE AND OTHER RODENTS ON ISLAND ECOSYSTEMS

House mice eat a variety of seeds, fungi, insects, other small animals, reptiles and eggs of small birds. Their diet directly contributes to and has the potential to harm terrestrial ecosystem functions such as the decomposer subsystem of islands (Rowe-Rowe *et al.* 1989, Crafford 1990, Amarasekare 1994, Newman 1994, Cole *et al.* 2000). For example, Newman (1994) found that increased predation by house mice caused the capture rate for McGregor's skink (*C. macgregori*) to decline on Mana Island, New Zealand. After successful mouse eradication, the population of McGregor's skink, the gecko (*Hoplodactylus maculatus*), and the endemic giant cricket (*Deinacrida rugosa*) increased significantly.

#### SUMMARY OF KNOWLEDGE OF HOUSE MICE ON THE FARALLON ISLANDS

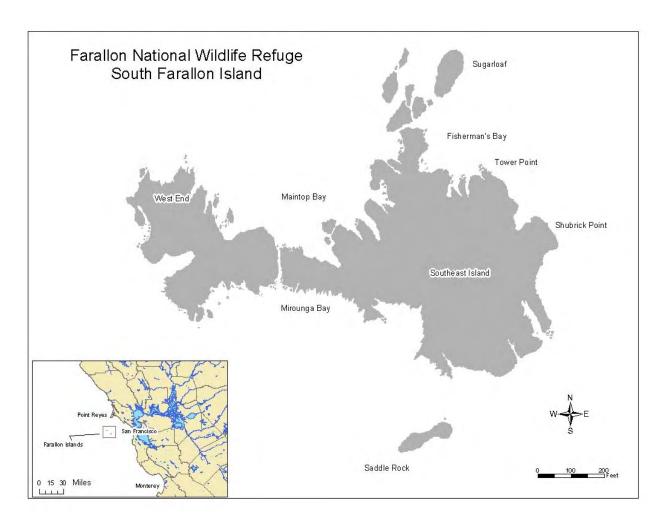
The Southeast Farallon Island (SEFI) (Figure 2) supported introduced rabbits, cats and house mice. Like rabbits and cats (that were successfully eradicated), house mice were introduced by previous human occupants of the island before it became part of the Farallon National Wildlife Refuge in 1969.

Information collected to date on the house mouse of SEFI indicate they:

1. Are distributed evenly on Southeast Farallon Island (SEFI) and have been observed on the West End (FNWR unpub. data).

- 2. Have not been observed on other islands (e.g., North or Middle Farallon Islands), nor are they suspected to occur on these islands since they have no history of human occupation.
- 3. Breed from April through November (FNWR unpub. data based on increasing number of mice captured).
- 4. Feed on native plants, invertebrates and seabirds (A. Hagen, unpub. data, Ainley and Bockelheide, 1990).

Figure 2. South Farallon Islands and offshore rocks.



# Impacts of House Mice on the Farallon Islands

Introduced species on islands often have ecosystem-wide impacts. However, once the distribution and abundance of native species has changed in response to competition or predation from the introduced species, the impacts of introduced species may difficult to detect. Consequently, there are four ways to estimate the impact of introduced species on island ecosystems:

- 1) comparisons from before and after the introduction or removal of an introduced species;
- 2) comparisons of exclosure plots, from which introduced species are removed, with similar plots from which introduced species are not removed;
- 3) comparisons of similar islands with and without the introduced species;
- 4) logical inference based on the diet of the introduced species and its impact on other island ecosystems.

There are no data from before the house mouse was introduced to the Farallons, and mouse exclosure plots are not technically feasible. Thus, to understand the likely impact of introduced house mice on SEFI one must make comparisons with other similar islands, use logical inference and models.

### **Seabirds**

Hypothesis 1: The eradication of mice will result in increases in one or more of the small hole-nesting seabirds on the refuge islands

On South Farallon Island, introduced house mice appear to be directly and indirectly impacting the breeding success of burrow nesting seabirds, particularly the Ashy Storm-Petrel. Approximately 50-70% of the world's population of Ashy Storm-Petrel (Fig. 3)

breeds on the Farallon Islands. While the Ashy Storm-Petrel has probably always had a restricted distribution and small global population size, recent data suggest this species is in danger of being extirpated from Southeast Farallon Island. Between 1972 and 1992, biologists documented a 42% decline in Ashy Storm-Petrel populations on the Farallons (Sydemann et al 1998). Mortality rate of Ashy Storm-Petrel on the Farallons also appears to be increasing. Recent population viability analyses predict Ashy Storm-Petrel populations will continue to decline at 3% per year (Sydemann et al 1998). Similar declines have been observed in populations of the Cassin's Auklet on the Farallons (Pyle 2001).

House mice are known predators of eggs and chicks of the Ashy Storm-Petrel with potentially as many as 12% of eggs and chicks lost to house mice (Ainley and Boekelhide 1990). Furthermore, mice may be important seed dispersers of non-native weeds that are known to degrade quality nesting habitat for seabirds such as Cassin's Auklet and Rhinoceros

Auklet (*Cerorhinca monocerata*) (FNWR, unpub.data.). More importantly, however, the exotic mice appear to be indirectly responsible for declining breeding



**Figure 3.** Ashy Storm-Petrels are in danger of extinction on the Farallon Islands

populations of Ashy Storm-Petrel (and to a lesser extent the Cassin's Auklet) on Southeast Farallon Island due to *hyperpredation* by non-resident, predatory owls. This form of *apparent competition* (see Holt 1977; Roemer et al. 2002) occurs when a local prey species (Ashy Storm-Petrel or Cassin's Auklet) declines due to predation pressure from a predator (owls that normally are not resident on the Farallons) sustained by an alternative prey, in this case the exotic house mice. This type of interaction is now thought to be an under-reported mechanism of biodiversity loss. An example of this phenomenom has recently been documented on Santa Cruz Island, California, where apparent competition and prey switching has led to the restructuring of the food web and near extinction of the island fox (Roemer et al. 2002). A similar pattern has been seen on islands where feral cats can maintain high population densities between seabird breeding seasons because they are subsidized by introduced house mice or rabbits (see Atkinson 1985, Keitt et al. 2002).

On Southeast Farallon Island, over-wintering owls are thought to cause significant mortality to the Ashy Storm-Petrel population and have a similar, but less severe impact on the Cassin's Auklet population. Each October, young Burrowing Owls (a species of special concern in California) arrive on the Farallons during migration (Pyle & Henderson 1991), at a time when the house mouse population peaks. Because of the abundant food source provided by the mice, the owls choose to stay at the island for the winter; - without mice on the island, the owls would continue migrating to more favorable wintering locations. Once winter rains set in the mouse population crashes and the owls are forced to seek other prey. Winter coincides temporally with the arrival of Ashy Storm-Petrels and Cassin's Auklets to excavate ground nest sites, causing the owls to switch their prey preference to seabirds. But the storm-petrels and auklets do not seem to provide enough nutrition for the owls, and most wintering owls die before the spring migration period occurs in April-May (emaciated owl carcasses are routinely found on the island by staff biologists). Up to 10 Burrowing Owls have been recorded wintering per year on Southeast Farallon Island, and biologists have found wings of up to 20 storm-petrels and 2-3 auklets at an owl roost site. The breeding population of Ashy Storm-Petrels on Southeast Farallon Island was estimated at only about 2660 birds in 1992and declining at an estimated 3% per year (1972-1992) (Sydeman et al. 1998) and suspected to be continuing to decline. This devastating scenario for both storm-petrels and owls, has been confirmed through the collection of owl pellets (~65 % of which contain storm-petrel and auklet feathers in late winter and spring) and an analysis of the occurrence patterns of raptors that do and do not prey upon mice (Mills et al. 2001).

Without mice, the South Farallon Islands are unlikely to support a wintering population of owls thus greatly reducing adult Ashy Storm-Petrel mortality on the colony. The less severe Cassin's Auklet mortality would also be reduced. The removal of mice will almost certainly encourage population recovery of the Ashy Storm-Petrel and other seabirds. In addition, the entire island ecosystem, including terrestrial invertebrates, the native salamander (*Aneides lugubris farallonensis*), landbirds, and native plants, will benefit from the removal of the nonnative mice. The eradication will prevent seed dispersal by mice and will make it easier to manually control exotic weeds.

#### Salamander

Hypothesis 2: The eradication of house mice will result in a long-term increase in the population size of the Farallon arboreal salamander (Aneides lugubris farallonensis), which is considered to be an endemic subspecies.

There is likely on overlap in the diet of mice and salamanders, and mice likely prey on salamanders. House mice removal has led to increases in lizard and amphibian numbers on other islands (see Newman 1994).

### **Terrestrial Invertebrates**

Hypothesis 3: Removal of house mice will result in an increase in the population size of terrestrial invertebrates.

House mice are known to prey on local invertebrates (A. Hagen, unpub. data). Removal of house mice has led to significant increases in local invertebrate populations (see Newman 1994). It is expected native invertebrates will show similar increases after house mouse removal from the South Farallon Islands.

#### Native Plants and Weed Dispersal

The native flora of the Farallon Islands has evolved in the absence of rodents, while most of the island's introduced plants have evolved with rodents. Consequently, house mice are likely to benefit introduced plants more than native plants. House mice feed on native plants and likely disperse seeds of non-native plants on the South Farallon Islands. In season, Farallon Weed (*Lasthenia maritime*) flower receptacles have been found in 45.1% of house mouse stomachs (A. Hagen, unpub. data) and mice are likely limiting the productivity of this valuable native plant. Removing house mice will improve the productivity of the native plants, and reduce the dispersal of weeds. The house mouse removal will

complement the ongoing management program to control invasive plants on the Southeast Farallon Island.

### OVERVIEW OF SUCCESSFUL HOUSE MOUSE ERADICATIONS WORLDWIDE

Mice have been removed from at least 20 islands worldwide, ranging in size from 0.7 ha to 700 ha (Table 1). All of the removals used a rodenticide, and none used trapping exclusively. There have been no successful eradications of rodents from islands using trapping alone (Moors 1985). Most of the mouse eradications have been done in conjunction with either rat or rabbit eradications. House mice have been eradicated by placing a rodenticide into every mouse territory on the island. This can be done by manually spreading bait, directly on the ground or into bait stations, or by aerially broadcasting bait from a helicopter equipped with an appropriate spreader.

Removing house mice from islands is significantly more challenging than removing rats from islands. Mice are much less susceptible as rats to the rodenticides, they have a much smaller home range and a complex social structure, and feed somewhat sporadically, trying a small amount of foods from many locations (Macdonald and Fenn 1994), versus rats which tend to feed regularly at a reliable food source. The behavioral and foraging differences between rats and mice indicate that to successfully remove mice from islands, a very high standard of bait quality, bait density, application style and rate must be guaranteed. In addition, there must be enough bait available to all mice in space and time.

Table 1. Successful House Mouse Removals from Islands.

Target species	Island	Size (ha)	Technique	Rodenticide	Reference
Mus musculus, rabbit	Enderby, NZ	700	Aerial	Brodifacoum	Torr 2002
Mus musculus, Rattus sp	Flat, Mauritius	253	Stations	Brodifacoum	Bell 2002
Mus musculus	Cocos, Mauritius	15	Stations	Brodifacoum and bromadiolone	Bell 2002
Mus musculus	Sables, Mauritius	8	Stations	Brodifacoum and bromadiolone	Bell 2002
Mus musculus	Mana, NZ	217	Aerial and stations	Flocoumafen and brodifacoum	Newman 1994
Mus musculus, Rattus sp	Fregate, Seychelles	219	Aerial	Brodifacoum	Merton et al. 2002
Mus musculus	Barrow, Australia	270	Stations	Brodifacoum	Burbidge & Morris 2002
Mus musculus	Varanus, Australia	80	Stations	Pindone and brodifacoum	Burbidge & Morris 2002
Mus musculus	Bridled, Australia	22	Stations	Pindone and brodifacoum	Burbidge & Morris 2002
Mus musculus	Beacon, Australia	1.2	Stations	Pindone and brodifacoum	Burbidge & Morris 2002
Mus musculus	Allports, NZ	16	?	?	Brown 1993a
Mus and Rattus norvegicus	Browns, NZ	58	Aerial	Bromadiolone	Veitch 2002a
Mus and Rattus norvegicus	Hauturu, NZ	10	?	?	D. Veitch, pers. comm
Mus and Rattus norvegicus	Motuihe, NZ	179	Aerial	Brodifacoum	Veitch 2002b
Mus and Rattus norvegicus	Moturemu, NZ	5	?	?	I. Mcfadden, pers. comm.
Mus and Rattus rattus	Motutapere, NZ	50	?	?	D. Veitch, pers. comm
Mus and Rattus norvegicua	Motutapu, NZ	2	?	?	Brown 1993a
Mus musculus	Mou Waho, NZ	140	?	?	McKinlay 1999
Mus and Rattus norvegicus	Whenuakura, NZ	3	?	?	Veitch and Bell 1990
Mus musculus	Papakohatu, NZ	0.7	?	?	Lee 1999
Rattus norvegicus Mus musculus	Isla Rasa, MX	59	Stations	Brodifacoum	Tershy et al. 2002

### REMOVAL OF MICE FROM SOUTH FARALLON ISLANDS AND ISLETS

#### **CONSTRAINTS**

Successful eradication of house mice from islands typically have three major technical constraints: weather, island size and topography, and native species.

#### Weather

Temperatures on the Farallon Islands are relatively constant throughout the year, seldom falling below 45°F or rising above 65°F. Most rainfall occurs in the winter. Summer moisture is usually limited to damp fog. Offshore fog banks frequently envelope the islands in dense fog.

There are no major weather limitations between September and November each year.

### Island Size and Topography

The  $\sim$ 50 ha South Farallon Islands are well within the size range of successful mouse eradications (Table 1). The vast majority of the island is accessible on foot except near the top of the island and the steep outer rocks, which presents a logistical problem to a ground based operation – danger to operators (ropes would have to be installed). Other potential problems to a ground-based operation include soil erosion and compaction along gridlines, and dispersing weed seeds into areas of the island that is currently weed free.

The aerial broadcast of bait would overcome all of the limitations of a ground based operation but efforts would be required to ensure that enough bait is available to all mice on the steep cliffs and offshore rocks.

# Native Species

A mouse eradication program could negatively impact native species through disturbance and by unintended, direct or indirect, exposure to the rodenticide. Specific mitigation measures to minimize the risk of disturbance and exposure to the rodenticide are outlined below.

### **Disturbance**

There are no species on the Farallon Islands that would suffer long term population level impact from disturbance due to eradication activities. Seabird nesting and marine mammal pupping on the island occurs during well-defined seasons, which will be avoided. There are no nesting landbirds on the island, however migrating passerines stopover on the few trees found on Southeast Farallon Island during spring and early fall. The project will take place during the non-breeding season, when numbers of seabirds, marine mammals and landbirds are at there lowest point. Disturbance to roosting seabirds and hauled out pinnipeds can be minimized by:

- 1. Timing the eradication to occur when wildlife species are using the islands minimally, and outside of the breeding season,
- 2. Timing the eradication to occur when the peak of landbird migration is over,
- 3. Phasing the field operations so that there is always alternative roosting/haul out habitat available,
- 4. Avoiding working for extended periods of time in vicinity of roosts, rookeries and haul outs,
- 5. Working cautiously and slowly around the animals using techniques that minimize disturbance.

### Non-Target Rodenticide Exposure

Unintentional poisoning can also directly and indirectly impact native species. Direct or primary poisoning can occur if non-target species consume the bait directly. Indirect

(secondary) poisoning of scavengers and birds of prey can occur from consuming poisoned house mice and/or birds. However, limiting the potential exposure or choosing a lesser toxic rodenticide can mitigate the impact to these species. For example, it is possible to time the project when these species have moved off the island and are not breeding, present the bait in protected bait stations and/or formulate bait that birds and scavengers would be less attracted to or unable to consume - such as a large, wax coated, green or blue dyed pellet colors that birds tend to avoid (Buckle 1994, H. Gellerman, unpub. data).

#### RODENTICIDES

For the successful eradication of introduced house mice from the Farallon NWR, the fundamental requirement is that every last house mouse is removed or killed. Thus, every effort is made to get the last house mouse. The use of bait containing a rodenticide is the only known technique capable of achieving eradication. The choice of bait must have a high likelihood of achieving eradication, but must be evaluated against potential negative consequences, such as non-target poisoning.

Strictly from an eradication perspective, the choice of bait used must:

- contain an active ingredient that is known to be highly efficacious to house mice,
- be palatable and demonstrate low or no bait shyness by house mice,
- delivered into the territory of each house mouse on the island,
- be consumed in sufficient amounts by every single house mouse to receive a lethal dose.

From an efficacy standpoint, the bait must contain a rodenticide that has the ability to kill the house mice and prevent the possibility of incurring bait shyness (individuals that will intentionally avoid the bait). There are three classes of rodenticides available on the market in the US. They are the acute rodenticides, the subacute rodenticides, and the anticoagulants (Table 2).

#### Acute Rodenticides

# Zinc Phosphide, Bromethalin

Acute rodenticides kill house mice quickly after a single feeding. The major benefit of acute rodenticides is that house mice die quickly before they build up high levels of rodenticide in their tissue. This reduces the incidence of secondary poisoning. However, there are two drawbacks to the use of acute rodenticides. First, they are often extremely toxic to humans and there are not always effective antidotes. Second, they can induce bait avoidance if animals consume a sub-lethal dose. For these reasons acute rodenticides have not, to our knowledge, been used to eradicate house mice from islands.

The acute rodenticides, such as zinc phosphide, are known to induce some degree of bait shyness due to the rapid onset of poisoning symptoms. Studies with zinc phosphide have demonstrated that rats associate the toxic symptoms with a toxic bait if the onset of symptoms occur within 6-7 hours of consumption (see Lund 1988). Thus, any individual surviving that round of exposure is likely to avoid the bait in the future (Record and Marsh 1988). To overcome this potential, it is recommended to pre-bait, where unarmed bait (i.e., bait without the toxic ingredient) is delivered into the environment and the target animal is allowed to consume the bait. After a period of time, the armed product is delivered and bait take is believed to be higher than with no pre-baiting, thus increasing efficacy. In island restoration projects, there is no guarantee that pre-baiting will increase efficacy to 100% and thus is not recommended. To improve acceptance and reduce potential of bait shyness, bait should contain an active ingredient that has a delayed onset of toxicosis.

Table 2. Characteristics of the Rodenticides Registered with the USEPA.

Table 2. Charact			8	Efficacy		Public	Health	No	n-Target Spe	cies
	Biological			Efficacy		1 ubite	i icaitti	Bis	rds	Inverts
Rodenticide	Half-Life in Tissue	Rodenticide Category	Previous Success in Island Restoration	Activity	Bait Shyness	Danger to Humans	Antidote Available	Primary	Secondary	Primary
Brodifacoum	Long	Anticoagulant	High	Single- Feed	Low	Low	Yes	Very High	Very High	No
Difethialone	Long?	Anticoagulant	None	Single- Feed	Low	Low	Yes	Very High	Very High	No
Bromadialone	Long	Anticoagulant	Low	Single- Feed	Low	Low	Yes	High	High	No
Chlorophacinone	No Data	Anticoagulant	None	Multi- Dose	Possible	Low	Yes	Moderate	Low to Moderate	No
Diphacinone	No Data	Anticoagulant	None	Multi- Dose	Possible	Low	Yes	Moderate	Moderate	No
Warfarin	Short	Anticoagulant	None	Multi- Dose	Possible	Low	Yes	Very Low	Low	No
Bromethalin	Short	Sub -Acute	None	Single- Feed	Likely	High	No	Very High	Low	Yes
Zinc Phosphide	None	Acute	None	Single- Feed	Likely	High	No	High	Low	No Data
Cholecalciferol	None?	Sub-Acute	None	Single- Feed	Possible	Moderate	Yes	Very Low	Low	No Data

#### Subacute Rodenticides

#### <u>Cholecalciferol</u>

Subacute rodenticides have similar properties to acute rodenticides, however, death may be delayed beyond 24 hours. Cholecalciferol disrupts the calcium homeostasis mechanism, resulting in the resorption of calcium from bone, and is the only subacute rodenticide registered with the US EPA. Death results from hypercalcemia causing kidney failure and heart arrhythmias. A benefit of cholecalciferol is that the symptoms are somewhat delayed between 24 hours to several days after ingestion. However, symptoms of toxicosis can be felt after ingestion of a sub-lethal dose that could result in development of bait shyness on recovery (Prescott et al. 1992). There is very little field data from the use of this product; however, it appears that it has potential as an island restoration rodenticide. Cholecalciferol was tested successfully to remove rats from a small offshore islet of San Jorge, Mexico (Donlan et al. 2002) It is not toxic to birds. (based on LD50 data) and preliminary data suggests it does not present a secondary poisoning hazard.

#### Anticoagulants

The most widely used rodenticides over the last 50 years have been anticoagulants, primarily warfarin and brodifacoum. They are incredibly effective compared to other rodenticides and about a dozen varieties have been developed, of which only 6 are available in the US. All anticoagulant rodenticides act by blocking the vitamin K1 dependent oxidation-reduction cycle in the liver. They also cause capillary damage. As a result, death is due to massive internal hemorrhaging (Taylor 1993). Because illness is delayed, house mice generally do not develop bait avoidance behavior and will continue consuming bait when ill. Thus, there is no social transmission of bait avoidance and no pre-baiting is needed.

There are three first-generation anticoagulants (warfarin, chlorophacinone, and diphacinone) and second-generation anticoagulants (brodifacoum, difethialone, bromadiolone). First generation anticoagulants require house mice to feed on the bait over a period of days, decreasing the probability that all house mice will receive a lethal dose. The second-

generation anticoagulants are able to induce mortality after a single-feed, dramatically increasing the probability that all house mice will receive a lethal dose.

#### First Generation Anticoagulants

The most widely used first generation anticoagulant is warfarin. The main benefit of warfarin is its low toxicity to birds (Kaukeinen 1993). However, house mice must feed over several days exclusively on warfarin bait in order to consume a toxic dose. The control of house mice can be a strong selection agent, increasing the frequency of house mice that cannot be killed via the control method used. Where populations of house mice have been previously exposed to rodenticides, some house mice demonstrate bait avoidance behavior and others may be biochemically "resistant" to the anticoagulant used. Most importantly, there has been no successful eradication of house mice with a first generation anticoagulant, that we are aware of. In Australia, mice were removed from islands using pindone, a first generation anticoagulant in conjunction with a second generation anticoagulant.

### Second Generation Anticoagulants

The second-generation anticoagulants will kill warfarin-resistant house mice and, if in sufficient concentration, kill house mice after a single feeding, thus dramatically increasing the probability of successful eradication. Only brodifacoum has been used successfully and repeatedly to eradicate house mice from islands worldwide. Currently, it is the primary rodenticide recommended to ensure successful eradication of house mice from islands.

Brodifacoum is the active ingredient in most off the shelf rodenticides such as DeCon. It is the rodenticide most commonly used by pest control professionals. It is the most frequently used rodenticide in successful house mouse eradication projects (Table 1).

Brodifacoum, like warfarin, is a coumarin-based anticoagulant (Chemical formula (3-[3- 4'-bromo(1-1'-biphenyl)-4-y-1]-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one)). Coumarin is a common substance in green plants that was discovered when moist and molded clover hay caused internal bleeding and mortality in cattle (Lund 1988a, in Taylor 1993). It is also found in high concentrations in *Gliricida sepium*, a Central

American plant widely used as a natural form of rodent control (Hochman 1966, in Taylor 1993). Unlike warfarin, brodifacoum is a second-generation coumarin that can kill house mice after a single feeding.

Detailed descriptions of brodifacoum and its effects on non-target species can be found in Taylor (1993), Kaukeinen (1993), and Howald (1997). The following discussion comes primarily from Taylor (1993) unless otherwise cited.

### Absorption & Degradation in Soil

The half-life of brodifacoum in soil is from 84-170 days and it is less stable in alkaline soils. Degradation of brodifacoum by soil microbes results in non-toxic metabolites in microorganisms, and eventual reduction to its base components of CO<sub>2</sub> and H<sub>2</sub>O.

### Half Life in Living Organisms

The half-life of brodifacoum in the tissue of living organisms is about the same as that in soil 150-200 days. However, there is some evidence that it may be somewhat longer. In house mice, and perhaps other mammals, 75% of a lethal dose is maintained in the liver, the rest is absorbed into other tissue at a variable rate.

### Soil Mobility of Brodifacoum

Brodifacoum is not soluble in water, and will not migrate from the land to the water supply or ocean. Because brodifacoum remains absorbed to soil, only erosion of the soil will result in it reaching the water. However, it would remain absorbed to organic material and settle out into the sediment, which would be widely dispersed and diluted by waves and currents.

### Uptake by Plants

Field tests have shown no significant transfer of brodifacoum from soil to grass, even at applications rates 15 times higher than normal rates of application on rangelands. No

brodifacoum was detected in samples of grasses collected post eradication on East Anacapa Island (Howald et al., in prep.)

### Effects on Humans

Brodifacoum is potentially toxic to all mammals including humans. Although there may be some skin irritation caused by contact with bait, poisoning is only likely if ingested. The lethal dose of brodifacoum for a human is likely between 0.28 - 25 mg/kg (based on the range of toxic doses in five species of mammals). Assuming the bait used on the **South** Farallon Islands would be 5 g pellets with 25 ppm brodifacoum, spread at 10 kg/ha, a 70 kg adult would have to find and consume a minimum of 140 pellets, which would be spread over a 700 square meter area to consume a lethal dose.

Even if a person did consume a lethal dose of bait, death is extremely unlikely because brodifacoum is slow acting and the symptoms are treated with the antidote vitamin K1. In fact, there are no recorded cases of accidental poisonings of humans caused by brodifacoum, even though brodifacoum is the most widely used second-generation anticoagulant rodenticide in the world (Taylor 1993).

### Effects on Marine Mammals

Because of the insolubility of brodifacoum (see above), and the large waves, strong winds and currents, it is highly unlikely that brodifacoum will in any way affect marine animals. Previous eradication programs using brodifacoum in New Zealand, the Mauritius Islands, and Canada, have not considered the threat to marine mammals as warranting serious consideration.

The pinnipeds using the island are piscivorous and will not consume any bait or dead and/or dying mice. They will be unable to find enough dead mice or bait pellets to warrant any concern. Fish will likely not consume any pellets that may enter the marine environment. Studies in New Zealand and California have documented no evidence of fish consuming the bait or brodifacoum moving through the marine ecosystem (ICEG 2000). No brodifacoum

was detected in shore crabs, hermit crabs, mussels or tidepool sculpins after rat eradication from Anacapa Island (Howald et al, in prep). Brodifacoum does not accumulate in tissues, or affect land crabs (Paine et al. 2000).

#### Effects on Marine and Terrestrial Invertebrates

Anticoagulant rodenticides are not known to affect invertebrates, likely because of their different blood clotting systems. Extensive field and lab trials have shown that tinibrionid beetles (Tershy et al. 1992), land crabs (Pain et al. 2000), snails, slugs (Howald 1997), and ants (B. Tershy, unpubl. data) can survive on a diet of 20-50 ppm brodifacoum. In addition, invertebrates do not appear to accumulate residues, minimizing the transport of brodifacoum into the ecosystem.

### Effects on Amphibians

Salamanders may feed directly on bait or on invertebrates that have fed on bait. However, this is unlikely to result in significant salamander mortality. There are, to our knowledge, no published studies on the toxicity of brodifacoum to amphibians or reptiles. Unpublished data suggests that snakes fed brodifacoum killed house mice (R. Marsh pers. comm.), and lizards force fed 50ppm brodifacoum survived for at least several weeks (Tershy unpubl. data). Eason and Spurr (1995) reported brodifacoum poisoned skinks, testing positive for brodifacoum residues and apparent hemorrhaging. However, neither study tested the ability of these individuals to breed. More conclusive is empirical experience from large-scale rabbit and rat eradication campaigns using brodifacoum. None of these have resulted in detectable mortality to endemic and native lizards, or declines in populations (Merton 1987). In fact, lizard and amphibian populations typically increased after house mice were eradicated using brodifacoum (e.g. Towns 1991, Cree et al. 1992, T. Comendant, pers. comm..), indicating that no extensive mitigation is necessary.

### Effects on Native Birds

Brodifacoum is toxic to birds. However, the toxicity is highly variable among species. The bird species using the island that are most likely to directly consume bait or poisoned house mice are granivorous sparrows and predatory birds (Table 3). We were unable to find published LD50's for non-target birds found on the Farallons, but published LD50's for several different Passerine birds range from 3.0-6.0 mg/kg. For an untested bird species there is a 95% probability that its LD50 will be above 0.56mg/kg (Howald 1997).

**Table 3.** Native Species at risk of primary and secondary exposure to the rodenticide.

Species	Primary	Secondary	Population Significance	Mitigation
Golden-crowned Sparrow	High	Low	None	None or Translocate
White-crowned Sparrow	High	Low	None	None or Translocate
Fox Sparrow	High	Low	None	None or Translocate
Burrowing Owl	None	High	None	Translocate
Barn Owl	None	High	None	Translocate
American Kestrel	None	High	None	Translocate

### **GROUND VS. AERIAL OPERATION**

Bait can be delivered by one of three ways: hand distribution to bait stations, broadcast by hand or aerially, and a combination of the two.

#### Hand Spreading to Bait Stations

This technique was developed in New Zealand, and has been used successfully on a number of islands (Table 1). Typically, for mouse eradication, bait stations are placed along a 10 x 10

m or 20 x 20 m grid and filled with pelleted bait or wax coated grain blocks with 50 ppm brodifacoum. Bait stations are checked daily until the bait take slows or ceases, then checked weekly and monthly. The bait stations remain on the island for 9-10 months. Rat eradication requires stations to remain in place for up to two years and is strongly recommended for mouse eradication.

The main advantages of using bait stations are: 1) it can limit access to bait by non-target species such as birds, and larger mammals; 2) it is possible to quantify bait consumption and to remove much of the bait that is not consumed. The main disadvantages are: cost, inability to deploy bait stations on cliffs, and trampling, erosion, and other disturbances caused during frequent visits to bait stations.

The vast majority of the South Farallon Islands are accessible on foot, except for the steep slopes, cliffs and peaks near the center of the island, and the majority of the islets, which preclude the use of bait stations without the installation of safety ropes and personnel who are good climbers. Additionally there could be unacceptable disturbance to marine mammals and other wildlife from repeated visits to bait stations over time.

# Aerial Application

On larger islands or islands with steep cliffs a broadcast of bait from a helicopter with an under slung bait spreader can be very effective. Pelletized bait is spread using differential GPS or ground markers to ensure even spread. Aerial broadcast of pesticides is a common practice in agricultural areas, and the technology has been adapted successfully to island eradications. The key to successful eradication is working with a good pilot and ensuring that bait is available in every mouse territory.

Removal of house mice by aerial broadcast has only been successfully implemented on two islands, in contrast with the numerous successful rat eradications. Mouse eradication was a secondary goal of the projects and it is unclear as to what factors were responsible for the successful mouse removed. On discussion with specialists involved with these projects, the reason for successful removal is unclear. There has been speculation that the social

hierarchy of mice is more structured than rats, and thus, requires a minimum of two pulses, at least 2-3 weeks apart for successful removal.

The main advantages of an aerial application are relatively low cost, safety for operators, short amount of time bait is available to non-target species, and minimum disturbance to vegetation, soil and wildlife. The main disadvantage is the inability to quantify bait consumption and to retract bait once it has been deployed.

#### Mixed Station and Aerial

This technique was applied on Mana Island, NZ where bait was aerially applied to steep, inaccessible cliffs, and manually applied in bait stations to the remainder of the island. This was first used successfully on Codfish Island, New Zealand during a rat eradication, to minimize risks to non-target birds in 1997 (McClelland 2002). Stations were used on  $\sim 40$  ha of the island to prevent birds from gaining access to the bait. The remaining island was treated using aerial broadcast. This approach was also used on a very limited scale on East and West Anacapa Island in 2001/2002, with apparent success.

The vast majority of the South Farallon Islands are accessible and could be treated with bait stations. However, the steep cliffs and unstable slopes on near the center of the island and offshore rocks necessitates an aerial or hand broadcast, without putting personnel in some degree of danger.

### ERADICATION OF HOUSE MICE FROM THE SOUTH FARALLON ISLANDS

#### **ISSUES CONSIDERED**

For the development of the recommended approach and mitigation needs, we identified the significant environmental issues to consider after a site visit to the island, discussions with the Farallon National Wildlife Refuge (FNWR) staff, and discussion with Point Reyes Bird Observatory (PRBO) biologists. We considered:

Probability of successfully eradicating house mice from the island.

- Potential non-target impacts to birds and mammals disturbance, exposure to the rodenticide and potential distribution of weed seeds into pristine areas of the island.
- Potential impacts to seabird nesting habitat and soil erosion.

The project must be successful in eradicating house mice from the South Farallon Islands, have minimal impacts to non-target birds and mammals, and the fragile island habitat.

#### RECOMMENDED APPROACH

#### Overview

We believe that a minimum 2-3 pulse aerial broadcast of bait containing 25-50 ppm brodifacoum, 2-3 weeks apart, is the most feasible approach to remove house mice from the FNWR, while balancing the environmental issues considered above. The refuge will need to conduct a feasibility study to test and refine the techniques for house mouse removal prior to the final eradication attempt. We recommend following the techniques currently used in California, Hawaii, New Zealand and elsewhere.

We suggest that bait be broadcast from a hopper suspended under a helicopter. The island should be blocked into two sections, perimeter and interior. We recommend the perimeter and offshore rocks be treated with the hopper fitted with a deflector (bait spread out one side of the hopper) to prevent bait spread into the marine ecosystem. The interior of the island can be treated with the deflector removed from the hopper and bait spread in a 360 degree pattern. The application rate will need further research, and will be determined by the density of mice on the island. House mice can have a very small home range (DeLong 1967) and it is absolutely critical that bait be delivered into every mouse home range in sufficient quantity. To ensure adequate application, the helicopter should be fitted with an onboard Differential GPS and computer and verified with ground plots, to ensure even bait application on the island.

### **Bait Application**

Successful eradication of rodents from islands by aerial broadcast requires the cooperation and dedication of experienced agricultural pesticide applicators or pilots experienced in eradications. There are many potential applicators in northern California that should be identified and assessed on their abilities to complete the eradication. The applicator used on Anacapa Island is located in Southern California, and is familiar with the high standard needed to eradicate rodents from islands.

A series of calibration trials will need to be conducted prior to the aerial operation on the FNWR. The hopper will need to be calibrated for flow rate and swath width – how fast and how far the bait is propelled out of the hopper. The flow rate, swath width and desired application rate together will determine the speed that the helicopter should fly. It is recommended that an aerial application calibration trial with non-toxic bait (bait with everything except the active ingredient) be conducted prior to the application. Monitoring of bait application should be ongoing while baiting to ensure that the hopper is operating correctly.

#### **Timing**

Rodent eradications from islands are more likely to be successful if they take place when the population is declining or at its low point in the annual cycle. The mice at this time are food stressed and more likely to eat the bait presented. Population monitoring of house mice on Southeast Farallon Island indicate that December through April is when house mice are at the most favorable point in their population cycle for eradication (FNWR unpub. data).

The timing of the eradication will need to balance the ideal biological timing of the eradication with weather conditions, operational logistics, and the potential disturbance to breeding marine mammals and seabirds. We recommend that the bait application take place at the tail end of the annual mouse breeding cycle, before the winter rains set in and to avoid pupping sea lions and elephant seals, most migratory landbirds and nesting seabirds.

#### Bait

Pesticide use in the US is highly regulated by the US EPA. The bait used on South Farallon Island will need to be registered by the US EPA under FIFRA. The process to register a bait product is complex and requires an in depth analysis of the regulations and consultation with other conservation practitioners using rodenticides in the field. There are three registration options —a Section 3 registration, Experimental Use Permit (EUP), or an exemption (Emergency or Quarantine). The Section 3 registration is not viable for the purpose of the project without an extensive data set that is currently unavailable. Unfortunately there are no baits registered with the US EPA authorized for aerial broadcast to remove house mice from islands. Either a new bait must be developed and registered with the EPA or the FNWR can build upon an aerial broadcast bait used on Anacapa Island, California (CI-25 containing 25 ppm brodifacoum) or Hawaii (Ramik Green containing 50 ppm diphacinone).

The bait should be formulated so that it is on the ground long enough for all mice to be exposed to it, but degrade rapidly to minimize the temporal risk of primary exposure. The bait should be formulated to prevent premature degradation in the wet, maritime climate, and dyed green/blue minimize the risk of primary exposure to birds. In addition, the bait should not contain bitrex (a bittering agent added to baits to prevent humans from consuming the bait), which will reduce palatability to the mice.

#### **Buildings**

Human activity on the island is the weakest link to successfully removing mice from the FNWR. The staff occupied houses provide ideal nesting and protection cover, with easy access to food such as crumbs, garbage and compost. Prior to the baiting, the garbage, compost and hygiene protocols should be evaluated and changed to further reduce the attractiveness of human foods and waste. In particular,

- 1. Garbage should be placed in sealable containers or barrels, not plastic bags, open containers or cardboard boxes.
- 2. All food containers should be rinsed prior to being placed into the garbage.

- 3. The compost should be removed and not used 3 months prior to the bait application and not re-activated until the mouse eradication is declared successful.
- 4. Several months before the baiting, the overall cleanliness should be improved, especially in the kitchen area, ensuring crumbs, spills, and dirty dishes etc. are cleaned up immediately.
- Foodstuffs should be stored in protected cupboards or containers inaccessible to mice.

All of the buildings will need to be treated with bait stations. We suggest that the FNWR develop protocols after consulting with a rodent control specialist experienced in urban rodent control. We recommend, Bruce Badzik, National Park Service IPM regional coordinator based out of the Golden Gate National Wildlife Refuge. Bruce has broad background in urban rodent control and experience in island rodent eradications.

#### **MITIGATION NEEDS**

#### Marine Mammals

The South Farallons are utilized by five species including Harbor Seal *Phoca vitulina*, California Sea Lion *Zalophus californianus*, Steller's Sea Lion *Eumetopias jubatus*, Northern Elephant Seal *Mirounga angustirostris* and the Northern Fur Seal *Callorhinus ursinus* throughout the year, with the vast majority of activity in late winter through early summer. Only the Steller's Sea Lion and the Northern Elephant Seal regularly breed on the island. Steller's Sea Lion pup May – July and Elephant Seals pup ~ December 25 to early March. (A few California sea lions and harbor seals occasionally pup on the during the summer months.) Therefore, field operations can take place from September through mid- December each year without disturbing breeding pinnipeds.

Seals and sea lions will likely be hauled out on the island during field operations and human activity at these treatment sites may disturb individuals causing them to temporarily relocate to an alternate haul out, away from the activity or return to the haul out after the disturbance has passed. Impacts to the pinnipeds may be displacement during aerial bait placement or

visits to bait stations and post-application monitoring. To lower the risks of disturbance, field operations should be conducted outside of the breeding season, and when the lowest numbers of individuals are using key beaches.

An aerial broadcast approach would cause minimal disturbance by overflights at haul outs. There would only be one to two overflights, the disturbance would pass quickly, and the animals would return to the haul out quickly (G. Howald, pers. obs.). Field crews can minimize disturbance at haul outs by working slowly and cautiously, and, if necessary, allowing for individual animals to move off key beaches slowly.

There would be no direct effect of the rodenticide bait on the pinnipeds since they are piscivorous. It is unlikely that they would ingest any bait directly, or secondarily from contaminated prey. A deflector mounted under a hopper used in aerial broadcast would be used to prevent bait spread in the marine environment. Any bait that may drift into the marine environment would not likely be consumed by fish (ICEG, unpublished data) or disintegrate rapidly due to wave action on the shoreline. The pinnipeds will not eat dead and poisoned mice. There is no likelihood that the seals and sea lions would consume enough of the rodenticide to cause any symptoms of exposure (National Park Service 2000).

#### Seabirds

There is a well defined seabird breeding seasons on the Farallons. Seabirds breed on the islands generally between mid-March and mid-August each year. Therefore, baiting on the island can take place from September through February with low risk of disturbing breeding seabirds.

#### Landbirds

Most landbirds arriving on the island are migratory and most seek out shelter at one of the three treed locations of the island. The majority of arriving landbirds stay for 1-3 days before moving on at the next favorable weather window. Peak fall migration occurs September through October. A maximum of ~5-10 granivorous Fox Sparrows, Golden-

crowned Sparrows and White-crowned Sparrows may overwinter on the island. There is no risk at the species level for any of these birds, however, there is a risk that individual birds may attempt to pick up and eat the bait. The bait pellets should be dyed green, a color that small birds tend to avoid, and the pellets should be large enough to prevent the birds from swallowing the pellets. Mist-netting and removing the individual birds from the island, or holding them in aviaries until the risk period has passed, ~3-4 weeks post application is a mitigation option that has been used successfully elsewhere for granivorous Passerines (Merton 2002). There is no need to mitigate for impact to insectivorous species as the risk of exposure to the rodenticide is much lower and not very likely to have an affect

# **Predatory Birds**

Birds of prey that feed on mice are particularly susceptible to the secondary exposure of brodifacoum from consuming poisoned mice after the application. Therefore, to prevent the loss of individual birds of prey, we recommend a mitigation program to live trap and remove the birds of prey that may potentially feed on mice, prior to the baiting and translocate to the mainland. This mitigation was successfully implemented on Anacapa Island in 2001-2002, with ~65 % of the local raptor population removed prior and just after the eradication effort. The overwintering raptor population on the South Farallon Islands is fairly small (~ <10 individuals) represented by ~0-1 barn owls, ~2-5 burrowing owls, ~0-1 American Kestrel, and 1-3 peregrine falcons. The loss of the individual birds of prey would not affect any of the species at the population level. The Burrowing Owl is a California state species of special concern, and live trapping and translocating burrowing owls would benefit the mainland population as individual birds that overwinter on the South Farallon Islands generally do not survive the winter.

### Threatened/Endangered Species

### **Brown Pelicans**

Brown Pelicans do not breed on the Farallon Islands, but roost on cliff faces during the fall. Although at least a few pelicans are present throughout the year, pelican use of the Farallon Islands is greatest in September through November, after birds disperse from their breeding

sites in Southern California and Mexico. Roosting pelican numbers peak in October, and begin to decline in November when the birds start returning to their breeding grounds. The majority of pelicans leave by February in most years. Pelicans may be roosting on the island during field operations, helicopter activity at these treatment sites may cause them to temporarily relocate to an alternate roost site away from the activity. Helicopter activity would be limited to one to two passes and phasing the aerial operation such that there would always be alternate roosting habitat available would minimize disturbance. There would be no direct effect of the rodenticide bait on the pelicans since they are piscivorous. There is no likelihood that they would ingest any bait directly, or secondarily from contaminated prey. The bait would be in a pellet form and is not expected to adhere to bird feet or feathers, therefore, it is unlikely that pelicans will inadvertently ingest the pellets during preening activities. Pelicans are not scavengers and will not eat dead and poisoned rodents. Pelican prey species are schooling fish such as anchovies and sardines, species which would not come into contact with the bait.

The implementation of this project will not have an adverse impact on the roosting or breeding population size, their fledging success or survival. Impacts to Brown Pelicans are limited to temporary displacement of roosting pelicans during aerial bait placement, and post-application monitoring activities. After the aerial application of bait onto East Anacapa Island in 2001, the numbers of roosting pelicans increased on the island (H. Carter, pers. comm.), suggesting that any disturbance would be temporary and not likely to adversely affect the federally endangered Brown Pelican.

#### Steller's Sea Lion

Steller's Sea Lion is the only federally listed species that breeds on the Farallon Islands. It is a threatened species and the South Farallon Island rookery and waters around the Refuge are designated critical habitat. Steller's sea lion breed in small numbers on the South Farallon Islands and pupping occurs from late May through mid-July. Ten or less pups are born each year. Peak numbers of Steller's sea lions occur during the summer. Another influx of

Steller's, usually occurs in the fall from September to December, when mother-pup pairs move from Ano Nuevo to haul-out on the Farallon Islands.

The project would occur during the non-breeding season, so impacts to Steller's sea lion would be limited to temporary disturbance to hauled-out animals during bait placement. Animals would be expected to move from their haul-out locations into the water, and return once the disturbance has passed. Even though this is not expected to have a long-term adverse affect on populations or individual animals, it would still likely be considered a "taking" under the Endangered Species Act, so a Section 7 consultation would need to be done with the National Marine Fisheries Service.

There would be no direct effect of the rodenticide bait on Steller's sea lions since they are piscivorous. There is no likelihood that they would ingest any bait directly, or secondarily from contaminated prey. Steller's sea lions will not eat dead and poisoned mice.

# Water CollectionSystem

The source of drinking and wash water on the islands is collected rainwater. All water used on the island is collected from surface runoff during rainfall events. Water is collected on an 18,000 square foot cement catchment pad during the rainy season (November-March). The water from the first few rainfalls are diverted to "wash" the buildup of guano before water is diverted into the settling tank. A wooden plank (flashboard) is used to divert water from the settling tank to the drain. On collection, water flows into a 8,000 gal. settling tank. Water is pumped from the settling tank to a 160,000 gal. storage cistern after each rainfall. Once a month, water is pumped from the cistern to the 10,000 gal. water supply tank which sits mid-way up lighthouse hill above the main house. Between the settling tank and the potable water spigots in the house, water passes through 11 different filter/treatment devices, in the following order: 50 micron, 25 micron, 5 micron and 1 micron GAF sediment filters, 2 ozone purifiers, two 5-micron sediment filters, 1 UV filter/light, nitrogen filtering medium, 0.1 micron fiter medium.

The risk of rodenticides entering into and contaminating the water supply is very low. The solubility of brodifacoum is very low, and will not enter into solution, unless attached to organic matter. The 6 sediment micron (50-0.1 micron) filters would filter any particulate that brodifacoum would be attached, further reduces the risk of brodifacoum from reaching the taps in the housing to near nil. There is no likelihood that brodifacoum of any measurable concentration or biological significance will enter into the water supply with very basic precautions.

- Exclude the concrete pad and storage tanks from aerial broadcast. The concrete pad and water storage facilities offer mice very poor quality foraging or cover habitat and are not likely using them extensively.
- Use bait stations in and around water collection facility.
- Sweep the concrete pad after aerial application and remove any pellets that may have drifted into the exclusion zone.
- Ensure the flashboard does not leak, completely isolating tank from water that is being flushed off pad.
- Trench the uphill side of the concrete pad to intercept and prevent pellets from rolling onto the collection pad.
- Increase the flushing/cleaning cycles.
- Use drinking water from the mainland until water quality monitoring of collected rainwater confirms no brodifacoum residues.
- Monitor collected water for brodifacoum levels at settling tank and taps in housing.

#### PROJECT COMMAND STRUCTURE & ORGANIZATION

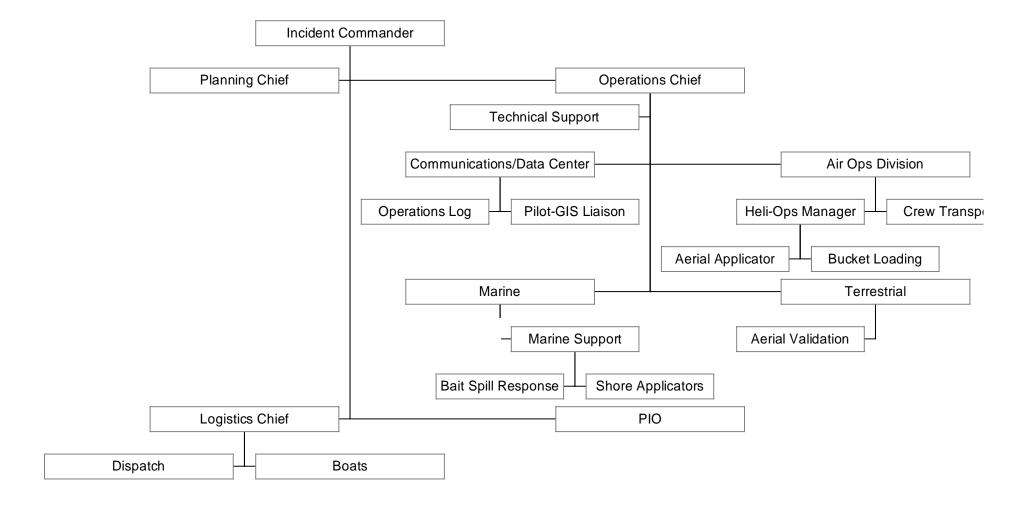
Successful implementation of the mouse eradication will require a team effort. The team should be lead by a project manager, responsible for all components of the project to ensure that all is completed. The project leader should bring together a team of people with expertise in

- USFWS requirements
- Logistics management

- Communications
- Island rodent eradication
- Environmental compliance
- Aerial bait application
- Aircraft management
- Public relations
- GIS
- Field biology
- Avian biology (raptor trapping, mistnetting Passerines, seabirds)
- Marine mammal biology
- Administrative support

The project should follow the Incident Command Structure (ICS), especially on the day of bait application (Figure 3).

**Figure 3.** Sample command structure for bait application onto the Farallon Islands. The actual command structure will need to be detailed and may or may not resemble the sample structure below.



#### ENVIRONMENTAL COMPLIANCE

Aerial broadcast of a bait containing a rodenticide onto the South Farallon Islands is a relatively new and innovative approach to conservation. Thus, the compliance process will be lengthy and in depth because of the biological and logistical complexity of the project. In addition to the internal USFWS regulations and Office of Aviation Services (OAS) requirements, the project must ensure compliance with a number of laws including the

- National Environmental Policy Act (NEPA)
- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Coastal Zone Management Act (CZMA)
- Endangered Species Act (ESA)
- Federal Insecticide Fungicide and Rodenticide Act (FIFRA)
- Marine Mammal Protection Act (MMPA)
- Migratory Bird Treaty Act (MBTA)
- National Historic Preservation Act (NHPA)
- National Marine Sanctuaries Act (NMSA)
- Wilderness Act (WA)

All of the above laws can be partially addressed under NEPA, however, there are additional permits and consultations required to ensure full compliance. We conservatively estimate a period of two years between start of the process through to completion.

#### **NEPA**

The FNWR will need to prepare an environmental assessment (EA) or an environmental impact statement (EIS) to document the environmental impacts that would be associated with the eradication activities. Because of the potential controversy and the nature of the methods, i.e., aerial broadcast of a pesticide onto refuge lands, the refuge should consider

completing an EIS rather than an EA. The FNWR should consider expanding the scope of the assessment to include an emergency response plan should non-native species be introduced to the island (including rodents and other vertebrates, invertebrates, weeds and pathogens) and a prevention strategy to reduce the potential for non-native species to be accidentally introduced to the refuge islands.

#### CAA

Can be addressed under NEPA. The project will not affect air quality as the broadcast of pellets will not affect air quality in any way.

#### **CWA**

The CWA can be addressed under NEPA. The assessment should make clear what mitigation will be in place to prevent bait broadcast into the marine environment and any monitoring to confirm success of those measures.

#### CZMA

The FNWR will need to pursue a <u>consistency determination</u> from the California Coastal Commission.

#### **ESA**

The FNWR will need to initiate an Internal Section 7 consultation with USFWS, Ecological Services and National Marine Fisheries Service for potential disturbance to listed Brown Pelicans and Steller's Sea Lions, respectively. This written document will conclude if project activities will have an effect, and if it is likely to adversely effect threatened/endangered species. A "likely to adversely affect" determination would require that a biological opinion be prepared by the USFWS/ES or NMFS. A "not likely to adversely affect" would require concurrence by these agencies.

#### **FIFRA**

The US EPA and the states control, through licensing and registration, the use of pesticides. The FNWR will need to use an existing registered bait product for the eradication, or pursue registration of broadcast bait with the US EPA, for use on the South Farallon Islands. Registration can be a lengthy process with delays lasting from 6 week to an indefinite amount of time depending on the chosen path for registration. There are three registration options –a Section 3 registration, Experimental Use Permit (EUP), or an exemption (Emergency or Quarantine). The Section 3 registration is not viable for the purpose of the project without an extensive data set. However, by the time the FNWR is ready to remove mice, there may be a product registered and available. If no product is available, the EUP or exemption process should be considered.

Bait applicators and loaders will need to be <u>certified and licensed applicators</u>. California EPA can provide all the appropriate training and certification.

#### **MMPA**

The potential for project activities to disturb hauled out seals and sea lions would be considered "take" as defined to mean "to harass, hunt, capture, or kill or attempt to..." (16 U.S.C. 1362 Sec. 3). The MMPA protects marine mammals from any "take" but will allow the disturbance of a small number of marine mammals if there will be a negligible impact on the affected species. Therefore, the FNWR will need to work with the National Marine Fisheries Service to develop effective mitigation measures to minimize risk of disturbance to marine mammals, and assess if an Incidental Harassment Authorization (IHA) is needed. There is an approximately 4-6 month delay between application and authorization for an IHA permit.

#### **MBTA**

The project will present a risk of primary and secondary poisoning of the few individual birds if they are not removed from the island prior to the baiting. It is unclear if USFWS Migratory Bird Office in Portland will require a MBTA permit for this project since the

project has long term benefit to migratory birds and the agency doing the action is the USFWS. Further discussions with the Migratory Bird Office in Portland, Oregon are needed.

#### **NHPA**

Can be addressed under NEPA. Southeast Farallon Island (SEFI) was listed on the National Register of Historic Places in 1977 based on a nomination that was made to the California State Historic Preservation by the US Fish and Wildlife Service (USFWS). Its historical importance is based on its association with the exploration and discovery of the California coast and its plethora of resident marine mammal and birds. In 1998, the FWS Cultural Resource Specialist (with concurrence from the California State Historic Preservation office) determined that the two residences and rail cart were historic properties and were contributing elements to the historic designation. No construction or modification of the rail cart or residences is needed to successfully eradicate house mice. However, there will be a need to eradicate house mice from the buildings, and may require slight addition of mouse proofing materials (primarily blocking of potential mouse holes with hardware cloth) to the residences. The FNWR should consult with the Cultural Resource Specialist to ensure compliance with the NHPA.

#### **NMSA**

The waters surrounding the FNWR are within the Gulf of the Farallones National Marine Sanctuary. An overflight permit will be required to fly below 1000' and within one nautical mile of the islands (to prevent disturbing seabirds and pinnipeds). The treatment of the islands will require the helicopter to fly at 50-100', over Sanctuary waters during maneuvers for bait application. Therefore, the FNWR will need to obtain an <u>overflight permit</u> from the Gulf of Farallones National Marine Sanctuary.

#### Wilderness Act

The offshore rocks and islets, and the West End (adjacent to SEFI) are designated Wilderness and project activities must be in compliance with the WA. The WA precludes

the use of motorized equipment, landing of aircraft, or construction of any structures. All project activities, particularly aircraft landing and flight origin, will be based on SEFI. Wilderness designation does not affect airspace, so low level flights over designated wilderness to drop bait would not conflict with wilderness management direction.

#### USFWS Pesticide Use Approval Process

The Refuge would need to submit a <u>Pesticide Use Proposal (PUP)</u> to the regional USFWS IPM representative to ensure compliance with 50 AM 12 – Pollution Control – Pesticide Use and Disposal.

# PUBLIC OUTREACH AND EDUCATION NEEDS

Mouse eradication and recovery of seabirds are tangible goals of a successful project. Another important, but less tangible goal is public support and a positive perception by the local and regional population. A negative perception by the public could result in the derailing of the mouse eradication before implementation and halting of other island restoration projects in California and elsewhere. Thus, a proactive public outreach and education program is recommended to ensure completion of a successful project.

In our and others experience, the removal of animals using any method, especially a lethal method, is unacceptable to some people and organizations. This strong moral and philosophical belief could rally individuals and animal rights organizations to try and stop the mouse eradication project using any and all methods available including disseminating misinformation through the media, challenging the project using the legal system, and even directly through sabotage and vandalism. These strategies are designed to draw negative attention to the project, and motivate the public to try and stop the eradication. Thus, the target audiences of a proactive media and education strategy are those that may be unaware of the project and issues, may be undecided about the project, and the misinformed.

The benefit of a proactive public outreach and education program is that the target audience is exposed to an accurate and complete information package, diffusing any of the damaging

misinformation that may be published in the local media or disseminated by any groups or individuals that may oppose the project.

A successful public outreach program integrates the requirements of the environmental compliance process and a well-defined educational component. The first step is to develop a strategy, followed by development of supporting materials and implementation of the plan. The basic components of a public outreach program includes:

- 1. a strategy that fosters a message of need and justification for the eradication plan.
- 2. well designed supporting materials eg. fact sheets, impacts of house mice, pictures.
- 3. soliciting support from big name organizations and individuals such as the American Bird Conservancy, National Audubon Society, and internally from cooperating/permitting government agencies.
- 4. planned media trips to the island and press releases fostering the perception of an open and transparent project.
- 5. an emergency communication plan in case something goes wrong or there is a significant challenge by animal rights advocates.
- 6. a legal response plan in case there is a legal challenge to stop project.

Because of the potential controversial and emotional subject of eradication, we recommend that the FNWR work with a professional public relations organization with experience in wildlife related issues.

#### SUGGESTED PRE AND POST PROJECT MONITORING PROJECTS

We recommend that the following baseline studies be done prior to eradication to ensure a high probability of successful eradication:

#### Evaluate the abundance and movement of house mice on South Farallon Island-

Using grid and/or trap arrays, the density of mice should be estimated around the targeted application period. The density will be used to estimate an appropriate application rate of

bait. Radio telemetry and inter trap movements on the trapping grid can be used to estimate territory size. The territory or home range area will be used to estimate an appropriate bait density or number of pellets needed per ha to expose all mice on the island to the bait.

# Conduct bait acceptance/palatability/efficacy trials of candidate baits –

Baits can be tested for palatability and acceptance using captive mice and field trials with a biomarker or with the active ingredient.

# Establish baseline monitoring of house mice to compare to post eradication monitoring –

Baseline monitoring provides an index of activity that can be used as a predictor of activity during post eradication monitoring. The pre-eradication monitoring of mouse populations should be developed using various techniques such as chew sticks (wax chew blocks), trapping (live and snap), and tracking boards. If no mice are detected using the above techniques, there is a high probability that the eradication was successful

We recommend that the following studies be done during the eradication:

#### Efficacy of poisoning, and consumption of poisoned house mice by other species-

Radio-collaring 10-25 house mice prior to the eradication can measure this. The fate of radio-collared individuals will be followed and the location of dead house mice will be recorded.

# Develop a GIS for "real time" monitoring of aerial broadcast activity and bait removal from monitoring plots-

Using existing technology, all baiting data should be systematically collected and entered into a GIS program for analysis. The GIS allows a "real time" view of activity of aerial baiting around the island and can be used to identify trouble areas. Permanent monitoring stations (target and non-target species) should be marked with a DGPS and placed into a GIS file for future reference.

#### Monitor impacts to non-target species-

Establish an ecotoxicological monitoring plan to evaluate the impact of rodenticides on the Farallon Island wildlife. There may be a regulatory requirement to collect tissue from sub samples of non-target species and analyzed for exposure to rodenticides.

## Develop and initiate a monitoring program for native species on the island-

Upon removal of house mice from South Farallon Islands, it can be expected that some native species will increase in density and abundance, particularly the invertebrates, plants, seabirds, and the salamander. To detect this "release" effect those species directly or indirectly impacted by house mice should be monitored before and after the eradication. This should be implemented as soon as possible to be able to detect a response of the local ecosystem to the removal of house mice.

#### RE-INTRODUCTION PREVENTION PLAN

A key component to the eradication is the development of a plan to prevent the reintroduction of mice or other non-native rodents, especially rats. The effort and conservation gains made from the eradication could be negated with the re-introduction of rodents or other non-native species. Invasive species, including vertebrates, invertebrates, weeds and pathogens can all be transported to the island inadvertently and have detrimental impact on breeding seabirds. The rodent re-introduction prevention program will be one component of a comprehensive program designed to prevent many non-native species from being introduced onto the island.

Preventing non-native species from reaching the islands requires that the potential introduction pathways be closed, or the risk via those pathways be reduced. Reducing the risk of introductions to the Farallon Islands National Wildlife Refuge will require a multifaceted approach including:

- controlling invasive species at departure points,
- implementing specific management guidelines for potential vectors, and

• prohibiting certain activities and materials destined for the islands.

The prevention plan should be incorporated into a larger management strategy for nonnative species. An effective management strategy should include plans for:

- 1) Preventing introductions
- 2) Early detection, responding, and eradicating if feasible,
- 3) Controlling if not feasible to eradicate,
- 4) Continuous, ongoing monitoring to evaluate progress towards goals or make necessary adjustments, and
- 5) Education for all stakeholders.

The successful implementation of this plan, and overall management strategy, will be dependent on a strong policy and compliance by all stakeholders including FNWR staff, cooperators, contractors and all visitors.

#### ESTIMATED BUDGET

Total estimated budget to develop the mouse removal plan, eradicate house mice with follow up monitoring is \$729, 398.67 over four (4) years (Table 4).

#### **TIMELINE**

We conservatively estimate that the project will take approximately 4 years to complete. The first two years will be dedicated to environmental compliance and securing permits, planning and conducting necessary pre-eradication research. The remaining two years will focus on post-baiting monitoring such as ensuring that the mice have been removed, and the environmental effects are as predicted. If no mice are detected two years post bait application, the island can be declared house mouse free.

**Table 4.** Budget for Farallon Island house mouse removal. Note that this is a preliminary budget developed Spring 2003 and will need to be adjusted to reflect actual costs on implementation. Budget assumes managed project and contracted out.

	Yea	r 1			Year	: 2	Ye				Year 4	
	Ph		radication Enviro e and R&M	Ph	ase II - Imp	lementation	Pł	ase III - Po	st Eradicati	on N	Monitoring	
Salaries & Benefits												
Project Leader (GS-11) Principal Investigator Field Biologists	\$ \$ \$	60,300.00 9,040.00 25,425.00 \$	5 94,765.00	\$ \$ \$	60,300.00 9,040.00 25,425.00 \$	3 94,765.00	\$ \$	30,150.00 4,500.00 8,475.00 \$	43,125.00	\$ \$ \$	19,500.00 2,250.00 8,475.00	\$ 30,225.00
Equipment												
Traps	\$	2,500.00 \$	2,500.00	\$	-	\$ -		\$ -	\$ -		\$ -	\$ -
Travel/Transport												
Boat transport Helicopter	\$ \$	11,000.00 3,500.00		\$ \$	15,000.00 25,000.00		\$ \$	5,000.00 3,500.00		\$ \$	5,000.00 3,500.00	
Support Travel&Housing of Technical	\$	3,500.00		\$	4,500.00		\$	2,500.00		\$	1,500.00	\$ 10,000.00
Experts Field per diem @15/day	\$	4,500.00	\$22,500.00	\$	4,500.00	\$49,000.00	\$	1,350.00	\$ 12,350.00	\$	1,350.00	
Materials and Supplies												
Outboard Gas/Oil/Maintenance	\$	1,500.00		\$	2,500.00		\$	500.00			\$	

	Year 1	1			Year	2	Year 3				Year 4		
	Phas		adication Enviro e and R&M	Ph	ase II - Imp	lementation	Phas	se III - P	ost Erad	ication	Monitoring		
Radio Collars (House Mice)	\$	3,500.00		\$	3,500.00			\$			500.00 \$		
Research Supplies	\$	7,500.00		\$	7,500.00		\$	500.00			500.00		
Bait and supplies	\$	1,600.00	\$14,100.00	\$	11,200.00	\$24,700.00		\$	1,000	\$ 0.00	500.00 \$		1,000.00
Stakeholder Coordination and	Public C	Outreach											
Videography Outreach Materials and Coordination	<b>\$</b>	12,500.00	\$ 12,500.00	\$ \$	20,000.00 7,500.00	\$27,500.00	\$	2,500.00			\$ 2,500.00	ı	
Miscellaneous Costs													
Toxicological Analysis	\$	1,500.00		\$	10,000.00			\$			\$		
Non-Target Bird Mitigation	\$	-	\$ 1,500.00	\$	22,000.00	\$32,000.00		\$ -	\$ 2,500	0.00	\$	\$	2,500.00
Sub-Total		\$	147,865.00		;	\$227,965.00			\$ 58,975	5.00		\$	43,725.00
Operating Costs													
FWS Project Manager FWS Admin Support (Utilities,	\$ \$	27,500.00 5,000.00		\$ \$	27,500.00 5,000.00			7,500.00 5,000.00			\$ 27,500.00 \$ 5,000.00		
P-copy, salary)	Ψ	5,000.00		φ	3,000.00		₩	2,000.00			φ <i>5</i> ,000.00		
Contractor Overhead (18% of Sub-Total)	\$	26,615.70	\$ 59,115.70	\$	41,033.70 \$	73,533.70	\$ 1	0,615.50	\$ 43,115	5.50	\$ 7,870.50	\$	40,370.50

	Year 1			Year 2	Year 3	Year 4	
		e I - Pre-Erac Compliance	dication Enviro and R&M	Phase II - Implementation	Phase III - Post Eradio	cation Monitoring	
	Total	\$	206,980.70	\$ 301,498.70	\$102,090.	50 \$	84,095.50
FWS Indirect Cos	t Recovery (5% of Total	al) <b>\$</b>	10,349.04	\$ 15,074.94	\$ 5,104.	53 \$	4,204.78
GRAND TO	OTAL	\$ 217,32	29.74	\$ 316,573.64	\$ 107,195.	03 \$	88,300.28
Estimated Proj Year 1-		\$ 729,398.6	7				

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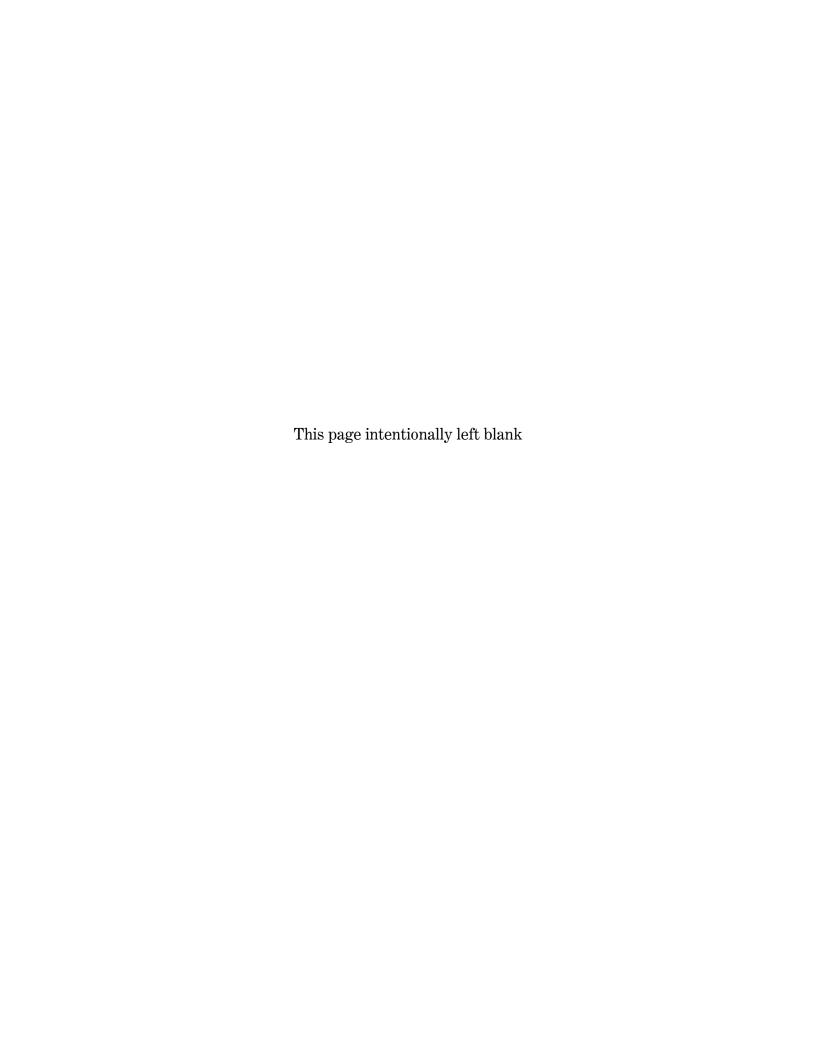
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# Appendix N. Farallon NWR Weed Management Plan

Prepared By Jesse Irwin and Joelle Buffa February 3, 2004

## Objective:

The purpose of this document is to outline the current invasive weed status on South East Farallon Island (SEFI) and provide a detailed plan of action designed to reduce or eradicate invasive weeds from the island. The island known as West End may be added to this plan in the future.

# Location:

SEFI is located in the Pacific Ocean 28 miles west of San Francisco, California (37°42'N, 123°00'W"). There is no legal description using township and range. The Farallon Islands collectively make up Farallon National Wildlife Refuge which is part of San Francisco Bay National Wildlife Refuge Complex headquartered in Fremont, California.

#### Description:

The Farallons are a group of small, rocky islands near the edge of the continental shelf. The southern Farallons include SEFI, West End, and Saddle Rock. Middle Farallon is 2 miles northwest of SEFI and the North Farallons are northwest an additional 4 miles. Noonday rock is just north of the North Farallons. Human activity is limited to SEFI and West End, though West End access is very restricted. SEFI is the largest island at 121 acres. There are currently two houses on the island used by refuge staff and Point Reyes Bird Observatory biologists. Generally staff size is between 4 and 8 people working there at one time. The islands are a key breeding ground for 12 seabird species. Marine mammals abound at the intertidal zone and water around the islands. The soil is generally very thin and rich due to thousands of birds during the spring and summer. The topography of the island consists of a sweeping marine terrace on the southern half of the island and steep ridges and points on the north half of the island. The entire island is important nesting habitat. Vegetation on the island consists of 5 wind stunted trees (3) cypresses, 1 Monterey pine, and 1 mirror plant) and a variety of forbs and grasses. Farallon weed (Lasthenia maritima), Spergularia macrotheca, and Spergularia marina are the predominant native species for which we will be managing. This area is entirely devoted to wildlife uses except for structures needed to conduct field operations. There are no agricultural activities on the island.

#### Management Goals:

The refuge goal will continue to be restoring the historical abundance of wildlife, particularly breeding seabirds by minimizing human influence and disturbance in addition to restoring habitat. We believe the best way to restore habitat is by reducing non-native vegetation and promoting natives. Habitat improvement has taken place for years and is an ongoing process. Remnants of historical uses by the military and Coast Guard are removed each year as resources permit. The long term goal is removal of any manmade structure not needed to support current activities and is not of historical value.

## Invasive Species and History of Control Efforts:

The island is infested with a variety of invasive weeds that degrade the value of habitat to wildlife. New Zealand spinach (*Tetragonia tetragonioides*) and *Malva spp*. have been the focal point of control efforts thus far. The north side of the island has been prevented from becoming infested by aggressive removal of any outlier weeds that appear in those areas and by limiting human foot traffic to the south side of the island. The north side of SEFI is accessed less than 5 times per year; to pull or spray outlier weeds and to monitor seabird index plots. The Marine Terrace has a low abundance of spinach as a result of long term control efforts. The hills that lead up to the Lighthouse have a high density of spinach, with the exception of north facing slopes. Malva occurs in dense stands around human structures such as the domes, water catchment pad, along the cart path, and single plants occur consistently around most of the island. Chenopodium, grasses, hogweed, plantain, and Erodium have received less attention.

The control strategy thus far has consisted of a big general herbicide spray effort in August of each year, intensive hand pulling in March before nesting season, and opportunistic pulling the rest of the year. In mid-August, a group 4 refuge staff biologists apply a 4% Roundup solution (active ingredient: 41% glyphosphate) or similar type herbicide with the goal of treating all spinach and Malva plants on the island. It is estimated that over 95% of the spinach plants and 75% of the Malva plants are sprayed each year. The timing requirements of nesting seabirds prevent the spray effort from taking place during the optimal time period. Some plants have mature seeds before we are able to treat them. To counteract this problem, plants are pulled throughout the year by FWS and PRBO staff. Limited spraying has also taken place in the fall. The amount of effort put forth to control weeds has varied year to year due to staffing situations.

## Management Plan:

The weeds of the Farallons are controllable species if enough time and effort is put forth. Time and funding are always top considerations. Logistics of transportation and accommodations add to the problem. All control efforts are conducted using manual labor which is very time consuming. In consideration of these issues it is necessary to prioritize the workload. The degree of invasiveness and impact on seabird habitat is the criteria used for prioritization.

The top priorities of the weed control effort are 1) prevent the spread of spinach and Malva from established areas, 2) reduce the area infested with spinach and Malva as much as possible, and 3) prevent the establishment of new non-native plants.

After spinach and Malva, non-native grasses and plantain are our second priority species. Our objective for control of these species is to first eradicate outlier populations and second reduce area covered by these species. The effort devoted to these species will increase when spinach and Malva have been significantly reduced.

Third priority weeds include hogweed (*Sonchus spp.*) and *Chenopodium spp*. We have no plans to allocate resources for control efforts of these species at this time. These species have been part of the plant community for many years and do not appear to be aggressively invading new areas or crowding out natives.

In an ongoing effort the refuge operations specialist and PRBO personnel continually monitor for and eradicate new weeds species as they are detected. This is one

of the top priorities for all public land agencies in the war on weeds. For example, two individuals of *Raphanus spp*. were pulled from the North Landing area in August 2003. This is clearly the most effective method of weed control, pulling a few individuals before they have the opportunity to spread and become a more difficult problem such as the weeds that are already established.

To combat the time crunch, we will work intensively in small areas on targeted weeds in each area while continuing control of spinach and Malva on the entire island. Areas of newly disturbed soil (human caused) will be Farallon weed spread over the area to provide a seed source. Areas that have been sprayed with RoundUp are candidates for reseeding with Farallon weed because spraying it clears the vegetation. Efforts will be made to spread Farallon weed over these areas.

Partitioning the islands into weed management units to address weed problems in individual areas has been suggested. By taking this action, areas that are currently weed free or nearly weed free can be used as an anchor point for attacking infested areas by working out from the anchor point. The division of the island would create many small sections for weed management purposes. The smaller sections of the island will then be prioritized. The prioritization will act as guide to direct weed control efforts throughout the year when weed control is sporadic. The purpose of doing this is to allow a more intensive control effort in small areas. The division lines for the smaller units are based on existing features such as the cart path, ridges, cement structures, and foot paths. There are sufficient existing landmarks to divide the island into appropriately sized management area. These areas should be small enough for a single weed puller to cover in a day. The abandoned paths on the south side of Lighthouse Hill are convenient divisions and the north and east sides of the hill can be treated as one unit each due to the small number of weeds.

It is not practical to physically remove weed seeds from the soil. By continuing to spray and pull weeds before they are able to produce mature seeds, we hope to reduce the viable seed bank in the soil over time. Germination testing has been conducted on sprayed spinach plants. The results indicate about a 2% germination rate.

**New Zealand spinach** (*Tetragonia tetragonioides*): The technique used since 1990 has been pulling in the spring and herbicide application in mid-August (September in the early years). We recognize that applying herbicides applied earlier in the growing season would be ideal, but is not possible until after the seabird breeding activity has diminished. This technique has had mixed results. Spinach abundance has been greatly reduced on the Marine Terrace relative to the hillsides. Plants sprayed in August have been tested and have about a 2% germination rate. However, the seed bank appears to be loaded with seed that remains viable for many years. One area we are looking at is the long term viability of seeds. If we can pinpoint the number of years seeds remain viable in the soil, we will better able to determine the success or failure of the control program. This would allow us to answer this question: are we controlling weeds from the plants of 10 years ago or are we controlling weeds from last year's plants? The fall spray effort has been thorough and consistent for over 10 years. The obvious question raised by the long term spray effort is what effect has the spraying had and why is there such a dense infestation remaining? The answer likely lies with the 2% germination rate of the sprayed plants. 2% of a huge number of seeds is enough to keep the infestation going. Removing the

seeds from the soil is not practical. By pulling and spraying all plants year after year we hope to eventually exhaust the seed bank.

It may be necessary to spray spinach in the spring at the expense of Farallon weed. This would be conducted in such a way as to minimize damage to Farallon weed. For example, areas of robust spinach plants could be spot sprayed in areas where Farallon weed is sparse or absent. The amount of effort expended on pulling spinach has varied year to year based on refuge staffing and the enthusiasm of PRBO biologists, but the spray effort in the fall has been consistent. A more consistent pulling effort in the spring is the area of the control effort that has the most room for improvement. A work party consisting of 2-4 volunteers should take place in early March before seabird nesting begins. The timing of the spray effort in August can't be moved forward to kill more seeds before maturity. The best way to get around this problem is consistent pulling and spraying in the fall and winter followed by an intensive pulling effort in March. If this can be accomplished, plants which sprout later in the year are not likely to have mature seeds when they are sprayed in August.

**Malva** (*Malva neglecta* and *M. parviflora, Lavaterra arborea*): Malva will be controlled using similar methods to spinach. Malva begins growing earlier in the winter then spinach but combining the control efforts is a necessity due to limitations of time and personnel. As mentioned earlier, most of the Malva is sprayed in August along with spinach. Much of the Malva has mature seeds by August so a more consistent pulling/spraying effort in the fall and winter will significantly reduce the number of mature plants on the island during the August spraying.

Lavaterra arborea or tree mallow is an invasive species on the mainland that has been allowed to persist on SEFI to benefit migrating birds. It is allowed to grow in three small dense clusters which facilitate bird banding work. It spreads slowly from these areas but in small numbers and is easily pulled while young. It is the responsibility of PRBO personnel to eradicate outliers. Farallon NWR management reserves the right to eradicate all tree mallow in the future.

**Grasses** (*Avena fatua, Bromus diandrus, Cynodon dactylon, Festuca sp., and Hordeum murinum*): The grasses listed above are annual species. They cure long before the August spray effort. There has been sporadic efforts made at clearing grass and re-seeding with Farallon weed. These areas have been successful in the short term but re-invaded within 2-3 years. While any project on SEFI is labor intensive relative to the same project on the mainland, clearing grasses is a particularly labor intensive part of the weed control strategy. It takes many hours to clear a relatively small area.

Grasses grow in thick mats which preclude seabirds from burrowing. Significant areas of the Marine Terrace are unavailable as nesting sites because of grasses. Farallon weed is used as nesting material by the seabirds to construct nests. We can treat a larger area using a grass specific herbicide before the seabird nesting closure in late winter. This will give a competitive advantage to native Farallon weed during the peak growing season. This strategy will be applied on a limited basis until we are confident it is the best method available to control annual grasses. The areas I propose using the herbicide with the label name of POAST (active ingredient: 18% Sethoxydim) include the area between Heligoland Hill and the powerhouse, the southern base of Lighthouse Hill, and

along the cart path from East Landing to North Landing. The optimal time of the application is usually November and December because the product label specifies spraying before the grass reaches a certain height. Also note that POAST (or similar) products use a crop oil concentrate surfactant instead of the R-11 type the Refuge uses with RoundUp.

Other options include manual removal of grasses and re-seeding or burning off areas of cured grasses in late summer or early fall followed by re-seeding.

NOTE: A fire management plan for the Farallons may be added to this plan in the future. Fire may be a tool we can employ to facilitate re-seeding of Farallon weed in areas overrun by grasses and plantain.

**Plantain** (*Plantago coronopus*): Plantain and grasses are second priority to spinach and Malva. They may become a higher priority if Malva and spinach are successfully reduced. Plantain has spread across the Marine Terrace and up Lighthouse Hill. The infestation is serious enough to negatively impact nesting seabirds by impeding the birds' ability to dig and maintain burrows. A new infestation was pulled from the North Landing area in June 2003 with a follow up pulling in August. No plants were found when the area was checked in November 2003. Plantain is a perennial plant which can be pulled or sprayed. It produces a large number of seeds which prolong control efforts.

The management plan for controlling plantain is as follows: 1) Prevent plantain from spreading to new areas by pulling or spraying, 2) If resources allow treat selected patches of plantain during the August spray effort. As mentioned in the grasses section above, a fire management plan may be implemented if we feel fire will be an effective control method in the future. This would be noteworthy for the grasses and plantain because of the growth pattern and timing of the weeds. Grasses and plantain grow in dense mixed patches on some parts of the terrace. The grasses begin drying in April and May while the Plantain actively grows all year. By September and October the grasses are completely cured. This is when we can burn off the dry grasses and the Plantain that is mixed with grasses. Any burning would be followed by re-seeding with Farallon weed. Plantain's response to burning will determine if a burn plan should be pursued for controlling plantain on the Farallons. Any burn would require plantain to be mixed with cured annual grasses to carry the fire. This restriction limits the potential areas fire may be used to clear plantain.

**Chenopodium** (*Chenopodium murale*): Chenopodium can be found in small numbers across the island and is a food source for some fall migrating birds. It has been an established part of the plant community for many years and does not appear to threaten native vegetation or degrade seabird nesting habitat. No control efforts are planned for *Chenopodium* at this time.

**Hogweed** or sow thistle (*Sonchus aspar*): No specific control measures are planned for hogweed at this time. We will monitor it and begin control efforts if we feel that is needed in the future. Hogweed appears as individual plants or very small groups distributed across the island. This species is either a relatively new infestation or it is only marginally suited for the habitat. Pulling plants appears to be a viable option

because of the low number of individual plants. Cutting the plant during early flowering may also be effective.

**Erodium** or stork's bill is abundant on the Marine Terrace and hill sides during winter and spring. Though it does not appear to be rapidly spreading, the potential is high due to the clingy nature of the seeds. We will continue to monitor Erodium and take action if necessary in the future.

#### Monitoring:

The above listed species will be mapped using GPS and processed into ArcMap files. This method will allow a more precise evaluation of infestation and progress of control efforts. Remapping each year will provide a database that will allow us to better determine the success or failure of control efforts and possible modification of methods. FWS digital photoorthoquads will be used as a base layer. Each species will be mapped individually. This will allow inter-species analysis when each species is a layer in the ArcMap file. After the initial vegetation mapping is completed it will be possible to precisely track the distribution of each species and will be a valuable toll in the adaptive management process. However, for this to be successful, weeds will need to be mapped each year. Photopoints will be established on the Marine Terrace and hillsides to provide visual images of changes over time.

# **Revisions:**

This plan will be reviewed annually to evaluate progress of control efforts and adjusted as deemed necessary for improved results. The refuge operations specialist and the refuge manager will be responsible for re-evaluation of the weed management plan.

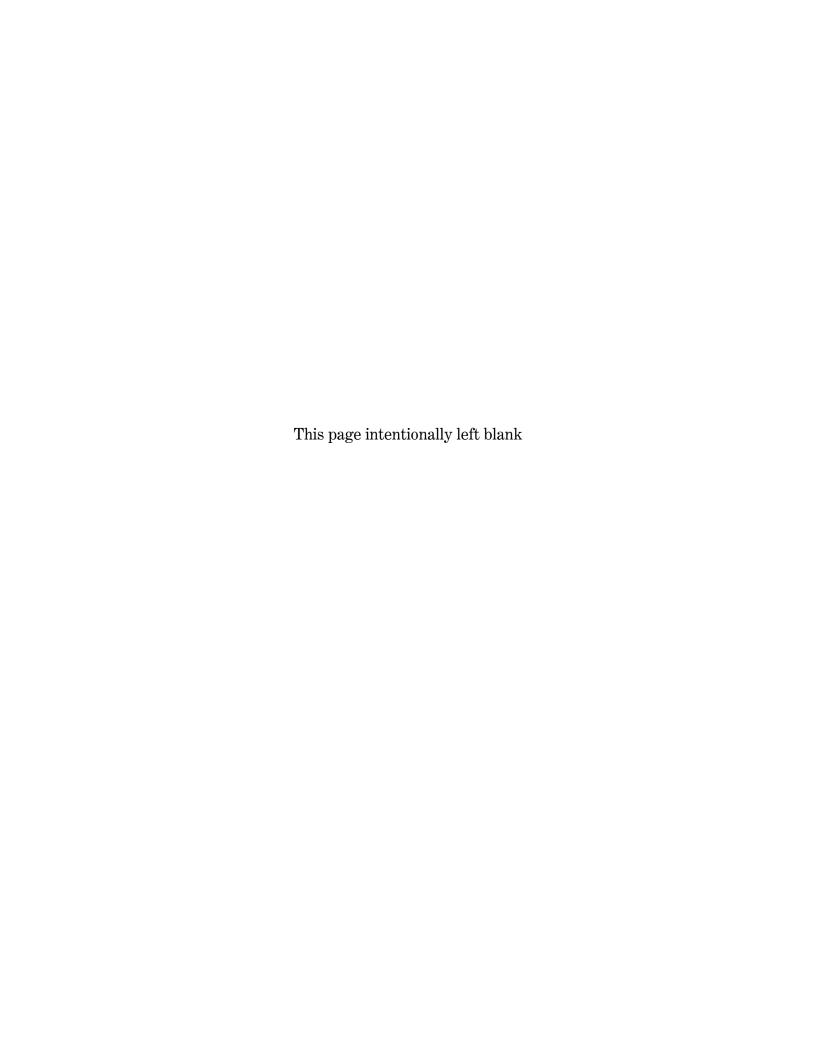
#### **Impacts**

The primary animals that could be impacted by management activities are nesting seabirds and the Farallon salamander (*Aneidus lugubris farallonensis*). The impact on seabirds of weed treatment activities will be minimal because most hand pulling and herbicide application will occur outside of the breeding season. The herbicides proposed for use are not harmful to vertebrate species. Salamanders are underground at time of application, but it is possible for exposure to occur within 12 hours of application. We use a spot spraying method of application instead of broadcasting, greatly reducing possibility of exposure. The most like impact on nesting seabirds will be the crushing of burrows. Habitat disturbance will be minimized by using only biologists and volunteers trained to avoid crushing burrows when conducting weed control operations.

Direct inquiries to:

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# Appendix O: Planning Team Members and Persons Responsible for Preparing this Document

# U.S. Fish and Wildlife Service

Joelle Buffa (Former) Refuge Manager, Farallon NWR

Winnie Chan Refuge Planner, San Francisco Bay NWR Complex

Jesse Irwin Wildlife Refuge Specialist, Farallon NWR

Gerry McChesney San Francisco Bay NWR Complex

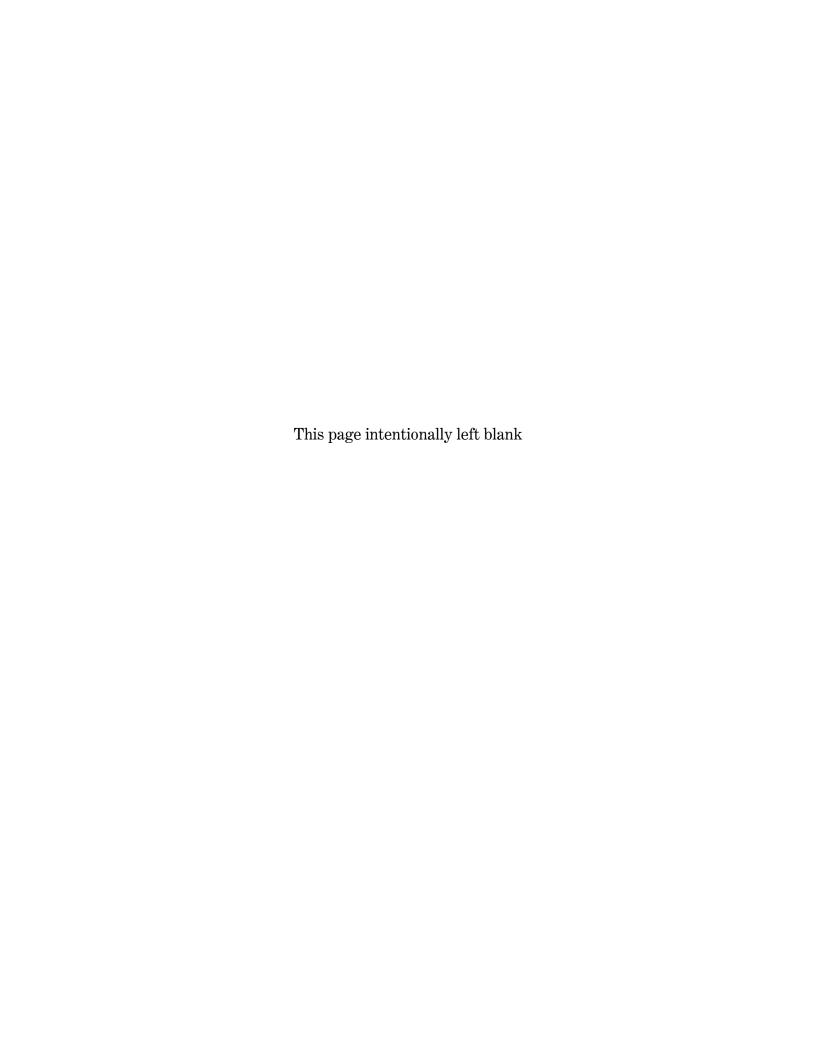
Mark Pelz Chief of Refuge Planning, CA/NV Refuge Planning

Office

Mendel Stewart Project Leader, San Francisco Bay NWR Complex

# **PRBO** Conservation Science

Russ Bradley



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March 3, 2009 Dear Mr. Clar, I am regised to any Justice occess to the Farallow Islands. The US Fish and Wildlife Service graftsal threatens the essential space there for keeding Appelations of Slakerds of Concern as bell as excluding the world's largest colonies of nesting cormorants, Western gullo plus passerines and ragters. The preferred alternative B provides to sented management grograms to Grotect and & ilstre histric level of Greeking Angulations. Having sailed arried the island of the fristine ensurament thee, Ise must firted these islands at all Costs and refuse Julie access. Thank you for your attention t Mary Elin. Buton 141 Cyfress are. Hertfield, CH 94904

- 1.1 Comment noted.
- 1.2 Based on factors such as the comments received; lack of public interest for public access; priorities of the National Wildlife Refuge System Mission; priorities of the Refuge; and concerns with safety, cost, and liability the Service has selected Alternative B as the proposed action.
- 1.3 Comment noted.

PRBO Conservation Science 3820 Cypress Drive, #11 Petaluma, CA 94954 707-781-2555 www.prbo.org





February 11, 2009

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Dear Ms. Chan,

We are writing on behalf of PRBO Conservation Science (PRBO) to comment on the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment (CCP). PRBO is an independent, scientific research non-profit which has been conducting research on and helping to steward the refuge's unique natural resources every day and night since 1968, in partnership with the United States Fish and Wildlife Service (USFWS). PRBO's mission is to conserve wildlife and ecosystems through innovative scientific research and outreach.

With over 40 years of continuous work on the Farallones, PRBO and partners have produced hundreds of scientific publications and made valuable scientific contributions to address management challenges including human disturbance, fishing bycatch, oil pollution, and establishing state marine protected areas. With our knowledge of the ecology and wildlife of the Farallones, we present in this letter some feedback on the CCP to help improve management of the refuge and ensure effective conservation of the wildlife that depends upon it. PRBO strongly supports most of the goals of this excellent and comprehensive management plan. Specifically, we endorse Alternative B and oppose plans for opening the refuge to public access, as suggested in Preferred Alternative C.

2.1

This CCP thoroughly and accurately describes the refuge, its resources, ongoing research and education programs, and current management approaches as well as alternatives for future management. PRBO strongly supports the management goals of wildlife protection and monitoring, habitat restoration, and education and outreach (Chapter 5). In particular, we are pleased to see the prioritization of ecosystem scale research that includes studies on foraging ecology, marine food webs, and climate change.

We recommend that the suggestion under Wildlife Management in Alternative C to "permit/encourage on island research focused on broad ecosystem questions that support the conservation of refuge wildlife" be added to Alternative B as well. Also, we wish to note that the proposed funds laid out in Chapter 5, Table 9 for Ashy Storm Petrel population assessment are much needed for this species of conservation concern.

2.5

Objective 2.3, to continue to implement and annually update the refuge's weed management plan, is essential to effectively address the impacts of non-native vegetation on Southeast Farallon Island. This plan should be based on ecological data to identify priority goals for managing invasive plants, taking into consideration wildlife impacts of different strategies.

PRBO has a major concern with the portion of Alternative C suggesting assessment of on-site wildlife dependent recreation, including guided tours. While we strongly support ongoing volunteer activities that meet refuge management goals of public education and conservation, opening the refuge to public tours and recreation could put one of our country's greatest natural treasures at risk by threatening sensitive wildlife populations with excessive human disturbance. Such activity may also pose serious risks to the visitors due to the dangerous conditions for landing on the island. Finally, the costs would be prohibitive, especially in light of the ongoing struggle to fund basic refuge stewardship and necessary research for effective wildlife management.

The Farallon Islands host the largest number of breeding seabirds at a single colony in the contiguous United States. The refuge is also an important breeding and haul out site for 5 species of pinnipeds. Seabird and marine mammal populations on the Farallones are extremely sensitive to disturbance as they have evolved in the absence of predators. Most of these species have suffered some decline due to human disturbance over the past century and more.

2.6

Even unintentional human disturbance of breeding seabirds can facilitate predation by other avian predators and reduce reproductive success. Sensitive habitats, such as burrows for cavity nesting seabirds, are extremely vulnerable to trampling by increased visitation. Increased public access could also result in the introduction of non-native species that directly threaten native species.

Furthermore, over the past four years some seabirds on the Farallones have shown poor breeding in response to recent climate variability. With the occurrence of climate extremes likely to grow in the years ahead, the federal government's U.S. Climate Change Science Program (<a href="www.climatescience.gov">www.climatescience.gov</a>) is recommending a number of management actions for natural resource management including the reduction of stressors on sensitive species. Allowing public tours and wildlife-dependent recreation would likely increase stressors significantly.

In addition, human access to the Farallones is very dangerous and island resources can not support traditional visitor services. The combination of unsafe landing conditions and difficult weather create significant potential liability with increased human traffic to and from the island. The only access methods to the island involve lifting by crane and intertidal landing making logistics extremely difficult and costly to accommodate increased access for public tours. Safe and effective landings at the Farallones require extensively trained and experienced personnel. Further, fresh water, toilets, and trash are already a severely limiting factor for island personnel.

The Farallones have a long history of human disturbance, including wide scale hunting, egging, harassment of wildlife, and introduction of non-native predators. This human disturbance threatened and reduced Farallon wildlife populations until the USFWS and PRBO took steps to significantly reduce human impacts to the islands and their resources. Actions included establishing biologically sensitive closed areas, controlling or eliminating introduced species, reducing impacts of research on sensitive areas, placing limitations on the numbers of island personnel, and educating the public about the impacts of disturbance to the island. The result has

been positive. Over 300,000 seabirds now thrive on the island and Northern Elephant Seals have recovered from the days of hunting and increased human activity. Over the last decade, Northern Fur Seals have re-established only the second breeding colony for their species south of Alaska. Several species of endangered birds and mammals breed on the island and research is conducted at a level that supports wildlife populations and can be sustained by the resources on the island.

The enormous public outcry in opposition to the 2005 proposed federal legislation that might have opened the Farallon National Wildlife Refuge to unfettered public access is instructive. Distinct from PRBO's concerns, we believe there is a vocal majority that would strenuously oppose any efforts to open this national treasure to public tours and wildlife-dependent recreation.

- Finally, the USFWS provides up to one third of the costs of the annual stewardship and research activities at the refuge. PRBO secures the remaining funds each year. Together, we struggle to provide the minimum annual funding required for our basic stewardship and research. Adding supplementary responsibilities and staffing for public tours and wildlife-dependent recreation could be cost-prohibitive.
- PRBO shares stewardship of this vital remote wildlife habitat and we are very sensitive to the potential effects that excessive human disturbance can have on this system. As a result, PRBO cannot support the Preferred Alternative C as currently written and endorses Alternative B.
  - As mentioned above, we wholeheartedly support soliciting greater public involvement through ongoing volunteer activities that enhance the goals of the refuge and benefit the conservation of its sensitive and unique wildlife populations. These volunteer activities also meet the stated management goal, which applies to all alternatives, of "wildlife dependent recreation and environmental education while preserving and enhancing wildlife populations and the wilderness character of the refuge." In such cases, volunteers from the general public can apply and be screened in order to participate. Volunteers must demonstrate their desire to further the goals of the refuge as well as their ability to work under potentially strenuous conditions.
  - We believe that the refuge's general public outreach goals can be met through more educational activities with visitors to the waters adjacent to the island, remote visitors via Internet web camera projects and new programs currently in development. These activities would allow a limitless public connection to the Farallon National Wildlife Refuge.

We are happy to provide further details if requested. As always, all of us at PRBO greatly value our strong partnership with the USFWS. We look forward to working with you to implement the final plan. Thank you for this opportunity to comment.

Sincerely,

2.9

2.10

Russell Bradley, M.Sc. Farallon Program Manager

Russell Bradly

Ellie M. Cohen Executive Director

Slei M. Co.

Cc: Mendel Stewart, Gerry McChesney, US Fish and Wildlife Service Jaime Jahncke, Melissa Pitkin, PRBO Conservation Science

- 2.1 Refer to response at 1.2.
- 2.2 Comment noted.
- 2.3 We did not include this in the proposed action Alternative B, but "research on an as needed basis to answer ecosystem-based questions" was retained to ensure that wildlife are protected from all types of disturbance when possible.
- 2.4 We agree. We plan to work on acquiring funds to support ashy storm-petrel assessments as stated in Chapter 5 of the CCP.
- 2.5 We agree. We plan to look at the impacts of managing invasive vegetation from an ecosystem perspective, considering how wildlife may be impacted from habitat management activities.
- 2.6 Refer to response at 1.2. We acknowledge your concerns regarding on-site recreation and plan to pursue other activities such as volunteer opportunities that support management goals. We have also included climate change objectives to assess the implication on refuge resources and develop strategies as suggested.
- 2.7 Comment noted.
- 2.8 Comment noted.
- 2.9 Refer to response at 2.6. Outreach efforts will be enhanced for the volunteer program to make it more available to the public.
- 2.10 Alternative B includes outreach efforts targeted at charter boat tours, interpretive specialists at public institutions, and website and live camera feeds of the Refuge and its resources.

## **Ernest Goitein**

167 Almendral, Atherton, California 94027

February 20, 2009

Winnie Chan, Refuge Planner Farallon NWR CCP, San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Subject: Farallon National Wildlife Project

Dear Ms. Chan,

I have looked at the Draft Comprehensive Conservation Plan (CCP). Here are my comments:

• I believe the purpose of the Farallon NWR is to provide undisturbed breeding and nesting habitat for pinnipeds and migratory seabirds.

3.1

- Alternative C will allow visitors for the purpose of public education. This violates the concept of the "undisturbed" requirement and must not be permitted.
- Alternative D seems the most appropriate in that certain areas are left undisturbed by human intrusion.

32

In summary, my recommendation is to implement alternative D. Under no circumstance should alternative C be approved.

Cordially,



- 3.1 Comment noted. The Refuge was established as "a preserve and breeding ground for native birds" (Executive Order 1043) and "for wildlife purposes" (Public Land Order 4671).
- 3.2 The Service has selected Alternative B in the final CCP to meet the conservation and management needs defined by the purposes of the Refuge.

FAX TO 11510.792.5828

19 FEB 2004

SAU FRANCISCO BAY NWR COMPLEX ATTN: WINDIE CHAN, REFUGE PLANNER

SUBJECT: FNWR CCP

I om in complete agreement with this excerpt from the CCCR February newsletter.

The U.S. Fish and Wildlife Service (Service) has released the Draft Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Farallon National Wildlife Refuge. Four alternatives are considered: A) no action, B) expand resource management, and increase public education and outreach, C) expand resource management, increase public education and outreach, and develop a visitor services plan that evaluates on-site wildlife-dependent recreation opportunities, and D) reduce human presence through closures of certain areas to monitoring and management activities, and increase public education and outreach.

The Service's preferred alternative is C which in addition to many positive recommendations, "evaluates and implements on-site public uses such as guided tours."

Let's consider the concept of allowing public access to the island. How many visitors are we talking about? How are these visitors to get to the island? Once there, how do they get ashore? There is no shore- just near-vertical rock cliffs. Currently there is no landing place at all, and visitors would have to be hauled up like so many sacks of potatoes. Who would determine who gets to go onto the island? Would the access be ADA compliant?

Once there, where would the water, electricity, and sewage facilities come from? What would happen when sea conditions would not permit a voyage back to the mainland? How long could visitors be stranded on the island and how would they be housed and fed? Has liability for risks to life and limb of the visitors been considered? Do you sense it would require a lot of money to deal with all of these problems? Money that could perhaps be better spent elsewhere?

The whole idea is so absurd it passeth understanding.

If you believe the most important function of the Farallon National Wildlife Refuge is to provide breeding and resting habitat for migratory seabirds and pinnipeds, and that the refuge should remain closed to on-site public uses, then please contact the Service to let them know you are opposed to implementation of Alternative C. I am opposed to C.

You must submit your comments by February 20, 2009. Please support either alternative B or X, since both provide protection and enhancement of the wildlife resources. The main difference between the two is that Alternative D prohibits access even to staff during the breeding period on some parts of the refuge.

Comments should be submitted to: Winnie Chan, Refuge Planner, Farallon NWR CCP, San Francisco Bay NWR Complex, 9500 Thornton Avenue, Newark, CA 94560. You may also e-mail your comments to: sfbaynwrc@fws.gov <mailto:sfbaynwrc@fws.gov>, or fax them to: 510-792-5828. When submitting by e-mail or fax, please include FNWR CCP in the subject line.

To view the document online please visit (http://www.fws.gov/eno/refuges/farallon)

(408) 739.5373

it is absolutely recessory to exceptional reasons. O. Charles Moore FROM: T. CHARLES MOORE 1426 FRANCHERA PL. SUNNYVALE, CA 94087

4.1 Refer to response at 1.2.

Martin Doyle 02/17/2009 10:57 AM Please respond to mdoyle\_2002

To: sfbaynwrc@fws.gov

Subject: Comments on CCP and EA plans for Farallon National Wildlife

Refuge

February 17, 2009

Dear Ms. Chan,

I am writing to express my opinion regarding the Draft Comprehensive Conservation Plan and Environmental Assessment for the Farallon National Wildlife Refuge.

Of the 4 alternatives proposed, I am vehemently opposed to option C. The expansion of resources and / or increased access to the public only serves  $5.1\,\|$  to encourage encroachment upon the natural resources. This impact upon the natural resource, however well managed, will always be detrimental to the health of the ecosystem.

The ecosystem is the most valuable component of the Refuge. It best thrives by being left alone in a native state, untouched and undisturbed by humans. To this end, I support the removal of non-native species (plant, animal, etc). Subsequent to this, I support only the most limited human access. Thus I support alternative D.

Thank you for your consideration.

Martin Doyle 36551 Lakewood Dr. Newark, CA 94560

- 5.1 Comment noted. Refer to response at 1.2.
- 5.2 Comment noted. With little interest in public access, the Service selected Alternative B because it best meets the conservation needs of the Refuge and NWRS to restore the Refuge to its native state.

Winnie Chan, San Francisco Bay NWR Complex, 9500 Thornton Avenue, Newark, CA 94560

Re: Draft Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Farallon National Refuge.

I strongly recommend against the selection of the "preferred" alterative C for the reasons given below.

As a board member of the Citizens Committee to Complete the Refuge (CCCR) as well as a life member of the Point Reyes Bird Observatories (PRBO) Farallon Patrol I am submitting my comments on the Draft Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Farallon National Refuge.

The Farallon Patrol is a group of yachtsmen who volunteer their vessels, time and expenses to provide logistic support for the PRBO scientists who care for and do scientific research on the Farallon Islands. I have been a member of the Farallon Patrol since the early years when it was under the egis of its founding organization, the Oceanic Society, and then continued participation after its sponsorship was assumed by PRBO.

During the mid 1980's and continuing through the early 2000's I made over 22 successful round trips to the Farallons. This was in addition to about a dozen trips or more which had to be aborted while in progress due to sudden and unpredicted deterioration of weather and/or landing conditions at the Farallons. It has been my experience that there is no such thing as a routine uneventful, or hazzard free trip to the Farallons.

There were several Farallon runs on which, after landing, weather and landing conditions deteriorated so much that my crew and I were unable to safely re-board our vessel, the rugged speedy, seaworthy 40' cutter Starbuck. We had to spend a long tense night on the Island, while I wondered if my boat would still be at its mooring in the morning, or if it had broken loose and was now just a pile of wreckage on the surrounding rocks or if it had been blown away into the vastness of the Pacific Ocean.

I support maximum public access to all wildlife refuges, consistent with little or no disturbance of wildlife and visitor safety. This being the case, I strongly recommend against the preferred alternative C, because I doubt that the "little or no disturbance" condition could be met and I know that the public safety condition could not be met. Certainly not at cost needed to justify a large expenditure of public funds for what, at best, would benefit only a few people and not everyone

6.2

who might like to visit the Islands. Also, since public funds would be involved, access would have to meet ADA requirements and facilities and supplies would need to be provided on the Island for the shelter and care of visitors in case of an emergency. Such being the case, I recommend the choice of either alternative B or D.

The choice of options in this case should not be made on principal, no matter how laudator, but on the realistic conditions involved.

6.3

I also recommend that the "Service" consult with, and depend on, the advice of PRBO staff, who work and do research on the Farallons, before choosing one of the options, because they are out there year round and best know the hazards, the Islands, and the weather in all their modes and variations.

6.4

As far as public viewing is concerned, one doesn't have go ashore to see the Farallons, because almost every square foot of the Island is visible from the decks of the tour boats that regularly come out from San Francisco and circle the Island.

The attached addendum consists of some relevant Farallon photographs with interpretive captions.

Respectfully Yours,

Ralph A. Nobles, Ph. D.

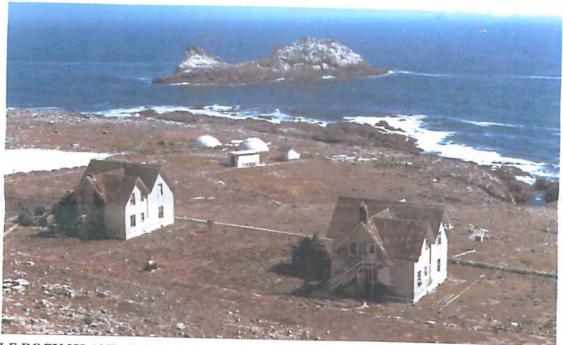
3720 Country Club Drive Redwood City, CA 94061-1110 (650) 365-0675 rlnobles@comcast.net

Raph a: Mobles

See addendum below.

cc: Florence LaRiviere (CCCR), PRBO, Manger SFBNWR.

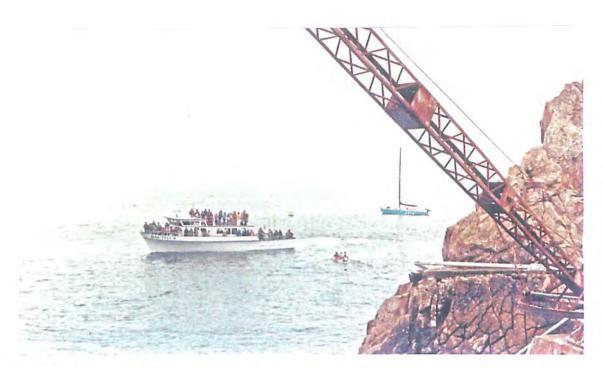
## Addendum:



SADDLE ROCK ISLAND: Saddle Rock Island, in the distance, is just to the south of the S.E. Farallon Island. On one of my Farallon Patrol Runs the sea was breaking over the low place in this Island (the saddle), which is a least 30 feet above sea level.



<u>EAST LANDING CRANE</u>: The people in the foreground are standing near the crane's electric control box, which must be at least 100 ft. above sea level. On one of my trips to the Island the crane was inoperable because sea water had shorted-out the control panel inside this box.



<u>EAST LANDING</u>: Tourist boat viewing the Island, and my yacht "Starbuck" at the East Landing mooring, in the right distance.



MY VACHT STARBUCK: Starbuck, straining at her east landing mooring, on a windy day. Note wire taught mooring line leading from her bow to the mooring buoy, off picture to left. In spite of her deployed "Rocker-Stopper" (roll damper) she was rolling scupper down port to starboard and pitching her bow clear of the water about 25 ft., back to the leading edge of her fin keel. On leaving San Francisco Bay on the way out that morning, a few hours earlier, we had light winds and a smooth sea.

- 6.1 Comment noted. Refer to response at 1.2.
- 6.2 Refer to response at 1.2.
- 6.3 We concur with your recommendation and will continue to consult with PRBO on most activities that occur on the Refuge.
- 6.4 We concur that tour boats provide optimal viewing of the Refuge and have added additional language in Objective 3.1 to work with docents and interpretive specialists for charter boat companies.

"Phil Henderson"
02/18/2009 08:19 AM
Please respond to "Phil

Please respond to "Phil Henderson"

To: <sfbaynwrc@fws.gov>

cc:

Subject: Farallon Public Access

ΗI

I worked as a seasonal biologist (era of Jean Takagawa) from 1974-1991 or so.

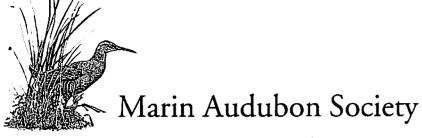
I always fantasized that the public could view the fabulous offerings of the island. I felt very privileged to be there. I used to mentally construct fantasy tunnels and such, where children could peek out at a puffin, or listen to seals and sealions barking and snorting; etc, etc, etc. I have a hobbits world of ideas from many long hours in blinds, there, and scouring the island in great solitude. I oppose garish and invasive changes to a place that is so precious in it's wildness; it is a sanctuary I would not like to see desecrated further. I built the eseal blind over the sandflat that is now gone, and also the North Landing blind overlooking cobble beach which, I hear, is gone as well.

- Though I would like it to happen it seems the expense would be exorbinate (a very top-heavy venture), and a political hot potato; especially when so many people are having a hard time just making ends meet.
- [7.3] I'm cutting this short as I realize I may have missed the deadline but I am more than willing to share years, there, of experience.

Best regards

Phil (Robert P) Henderson PO Box 261 Guerneville CA 95446 707-695-7440

- 7.1 Comment acknowledged. The alternatives consider habitat needs and how to maintain the natural solitude of the Refuge. The proposed Alternative B will focus on wildlife needs while emphasizing external off-site opportunities.
- 7.2 As public access is not longer in the final CCP, expenses for infrastructure is no longer a consideration.
- 7.3 Thank you for offering your expertise, we may consider contacting you at a future date.



P.O. Box 599 | Mill Valley, CA 94942-0599 | Marinaudubon.org February 19, 2009

Winnie Chan San Francisco Bay National Wildlife Refuge Complex 9500 Thornton Avenue Newark, CA 94560

RE: FARALLON ISLANDS NATIONAL WILDLIFE REFUGE MANAGEMENT PLAN AND ENVIRONMENTAL ASSESSMENT

Dear Ms Chan,

The Marin Audubon Society appreciates the opportunity to submit comments on the Management Plan and Environmental Assessment for the Farallon Islands National Wildlife Refuge. We find the description of the environment of the Farallon's to be comprehensive. It describes the environment of the Farallon Islands, the species that depend on it for breeding, feeding and resting, and the significance of its resources, to be comprehensive.

This unparalleled. resource provides breeding habitat for more than ten species of seabirds and for many species of marine mammals. As noted in the discussion, all of these species are vulnerable to human disturbance. Every effort should be made to ensure that they and their breeding habitat are protected.

- The history of the islands and behavior of the species nesting on them should be used to guide management. Human activities have caused significant damage and degradation. Observation of colonial nesting birds here and elsewhere shows that disturbance causes adult birds to abandon nests leaving the young vulnerable to predation by gulls. It is the responsibility of the owners and managers to ensure that all native species are protected from all human-caused disturbances to the maximum extent possible.
- [8.2] Generally, we find Alternative B to be the preferred Alternative because it provides the most complete protections for the Refuge's unique resources. Specifically, we:
  - Strongly oppose opening the islands to public use under any circumstances, as proposed in Alternative C. Human presence by scientists and volunteers is disturbance enough. Further, there is no need for the public to visit the islands. People can view the birds and the island from boats on the water. We and other organizations do field trips during which people can enjoy the view, and learn about the ecology from naturalists. It is also dangerous to board the islands. Allowing public access would increase the risk to visitors a expose the government to increased

liability. We strongly oppose this element of Alternative B.

- 8.4
- Support removal of non-native house mice to ensure maximum protection for Ashy Storm Petrel. We are generally opposed to the use of rodenticides, but in this special case we support its limited use during the time birds are not nesting, and on the condition that the burrowing owls are translocated off of the island when the poison is applied.
- 2.5
- Support removal of non-native plants and restoration of the islands to a natural condition. In order to accomplish this, the refuge's weed management program on the South Farallon Island. should be continually evaluated and revised wherever necessary. Hand removal should be the method of choice wherever possible, and herbicides used only when hand removal cannot be used and all nesting birds have left the islands. While we can understand the importance of volunteers for this effort, because of the safety issues related to accessing the islands, we recommend that the plant removal be undertaken by a limited number of well trained volunteers.
- 2 6
- Support monitoring of bird and marine mammal breeding populations and of species using the islands during non-breeding season. It is critical to obtain breeding and population data in order to further understanding of the ecosystem of the region, of the wildlife that depend on the islands and to ensure their protection. Effort to avoid and minimize disturbance should be made.
- 8.7
- Support education of classes of coastal schools and tour boat captains. If possible, boats should be banned from using such practices such as shark caging diving that can be a major disruption to the ecosystem.

Thank you for considering our comments.

Singerely

Barbara Safzman, Co-chair Conservation Committee Phil Peterson, Co-chair Conservation Committee

- 8.1 We concur that breeding habitat on the Refuge should and will continue to be protected. Objective 1.2 expands law enforcement coordination and public outreach to protect refuge resources and improves the Refuge's visibility as a protected area.
- 8.2 We concur.
- 8.3 Refer to response at 5.2.
- 8.4 Comment noted. The mouse eradication project will not occur during the nesting season. Sensitive species such as the burrowing owl will be translocated as needed.
- 8.5 Adaptive management and monitoring are critical tools to effective vegetation management. The existing plan will be revised as new plant information becomes available. Herbicides are highly restricted and applied by hand on individual plans during the non-breeding season. Volunteers participating in weed removal will continue to be pre-screened and trained for physical ability to travel to the island to perform removal duties on the uneven terrain.
- 8.6 Comment noted. Research protocols have been developed to reduce or avoid wildlife disturbance. These protocols are detailed in the compatibility determination for research in Appendix J.
- 8.7 Outreach efforts to tour captains will be made to tour boat operators that frequent the islands. Outreach materials will also be developed for school programs.

Robin Winslow Smith <rwinslows@sbcglobal.net> 02/24/2009 10:51 AM

Please respond to rwinslows To: sfbaynwrc@fws.gov

cc:

Subject: FNWR CCP

Dear Ms. Chan,

Sequoia Audubon Society would like to go on record as preferring alternative D as outlined in the Draft Comprehensive Conservation Plan. We are most interested on providing an atmosphere on the Farallons that supports protection of the breeding birds there.

In the past, our chapter had a presentation of the Farallons at general meeting. There were photos of the method used to get ashore as well as of the island itself. We do not think visitor safety could be quaranteed wiwth the current system nor do we think it would be advantageous for the breeding species.

Our members and the general public have a great interest in what goes on at the Farallons. Our suggestion would be to set up a webcam so that the public

could participate without needing to go on the islands.

Thanks for the opportunity to comment.

Robin Smith

Conservation Coordinator Sequoia Audubon Society

- 9.1 Comment noted. The Service has selected Alternative B as we believe it provides both the protection and monitoring needs necessary for adaptive management.
- 9.2 Refer to response at 1.2.
- 9.3 We plan to set up a remote camera system to provide "virtual" on-site public access as noted in Objective 3.2.

February 13, 2009

Winnie Chan San Fransisco Bay NWR Complex 9500 Thornton Ave. Newark, CA 94560

RE: Draft comprehensive Conservation Plan

Dear Ms. Chan:

There has been a recent proposal by the Fish and Wildlife Service [D-CCP/EA] to construct a visitor's center and allow visitation of the Farallon National Wildlife refuge. The Farallon Islands, located off the California coast, is the largest area for seabirds in the United States as well as winter habitats for many migrating birds. The island is undisturbed by humans, but the introduction of tours to the island will agitate the habitat of the birds. Thus far, no environmental impact statement has been done to assess the impact of human visitation to the islands.

There are ample opportunities to view the species of the birds nesting on the island in other location along the California coast. These other locations are not as densely populated, and therefore, human visitation will affect fewer birds. Since the Farallon Islands are the largest breeding ground, disturbing this particular location may have a significant impact on the bird populations residing there. Additionally, the birds that populate the coast are in danger of the direct impact of living so closely with humans on their environment, which is why it is so important to preserve these islands so that the birds may have a refuge free from human contact.

Without proper and protected nesting grounds, the birds will be unable to maintain a healthy reproduction rate, causing serious damage to the population size in the future. The islands are, also, free from many predators of the birds and their eggs. If the birds are forced to abandon their nesting site due to the impact of human presence, they may be subject to predation.

Before any further action is taken to implement plans for tours and a visitor's center on the islands, an environmental impact statement must be done. Since these species of birds may be viewed in other locations, visitation to the islands in unnecessary and should be avoided altogether. Please act to prevent the disruption this will cause to the birds and their habitat to ensure that these species do not end up in the endangered species list in the future.

Thank you for the opportunity to comment on this very important decision. I appreciate your willingness to consider the thoughts and concerns from the public.

Very truly yours,

10.1

10.2

10.3

Canvin Desagel

- 10.1 The draft CCP/EA has not identified plans for a visitor center, only to assess visitation potential. Because of the lack of interest and support for public access such as tours, the Service is now selecting Alternative B which does not include development of a visitor services plan. Refer to response at 1.2.
- 10.2 Refer to response at 8.1. The Service will also evaluate the need for expanded closure areas on and around the Refuge.
- 10.3 Because tours are no longer a consideration in the CCP, an EIS will not be conducted.



## OCEANIC SOCIETY QUARTERS 35 N, FORT MASON SAN FRANCISCO, CA 94123 USA 415 441-1106, www.oceanicsociety.org

February 19, 2009

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Dear Ms. Chan,

I am writing on behalf of the Oceanic Society to comment on the Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Farallon National Wildlife Refuge.

Established in 1969, the nonprofit Oceanic Society's purpose is to protect endangered wildlife and preserve threatened marine habitats worldwide. The Society's mission is primarily accomplished through the creation of protected natural areas, supported and sustained through scientific research.

Our approach to environmental protection includes fostering a conservation ethic. Our educational Farallon Islands boat trips serve as a platform for achieving that goal. The Society pioneered educational trips for the public to the Farallon Islands in 1984 and has offered them on a weekly basis from May through November, serving close to 50,000 individuals. In addition to the general public, specialty groups such as the American Association of Geographers, Smithsonian, and the Girl Scouts have cosponsored this educational opportunity. We also support the research efforts of Cascadia Research Collective by providing gratis space on our Farallones trips, as well as providing free transportation to other Bay Area non-profits for conservation objectives.

Oceanic Society supports the general goals of the of the CCP but suggests another alternative, one that combines the non-intrusive elements of Alternative B and C. One specific exception to Alternative C is the section that recommends the Development of a Visitor Services Plan that evaluates on-site Wildlife Dependent Recreation Opportunities. We are also concerned about the consideration of any further boat restrictions to the islands.

11 1

Oceanic Society has a 5-year history of operating educational natural history and participatory research trips at remote Midway Atoll National Wildlife Refuge. We recognize the value of public access to help achieve Refuge purposes. However, with the benefit of several on-site visits to Southeast Farallon and our own experience with wildlife dependent recreation, we believe another strategy would better serve the public access purpose for the Farallon National Wildlife Refuge. We concur with Point Reyes Bird Observatory that the wildlife disturbance issues are of great concern but we also see significant issues regarding safety and liability.

11.3

We recommend increasing current media trips and also offering special teacher and professional educator trips during least intrusive times. We also recommend increasing the number of volunteer opportunities and expanding public outreach to announce those opportunities broadly.

We believe that increasing these non-intrusive public educational opportunities can be accomplished by including them in the Final CCP, with minimal Refuge addition expense and personnel. An added benefit would be providing addition public interaction with the Farallon Refuge in a more timely fashion without the additional administrative burden of preparing a Visitor Services Plan.

We believe outreach can be enhanced in many different ways, and many of the recommendations in Alternative B and C are already in place with many others in development. We encourage multiple partnerships, and strongly support the idea of a traveling Farallon Islands exhibit.

11.4

The Oceanic Society would be happy the expand our existing partnership to assist the Fish & Wildlife Service to recruit volunteers for the refuge, and assist with preliminary screening using our experience with recruiting, screening and training habitat restoration volunteers.

In 2008, the Oceanic Society in partnership with the U.S. Fish & Wildlife Service, produced *The Farallon Islands, Past Present and Future*, a 30-minute film that provides an intimate, behind-the-scenes glimpse of the Farallon Islands and the Farallon National Wildlife Refuge. The film, which is available as a DVD, takes a close look at the islands' natural and human history, as well as threats to the islands and the ongoing conservation, research and restoration efforts, among other topics. The purpose of the film was to bring the Refuge to the people rather than the people into the Refuge. The film is scheduled to be shown throughout the Bay Area; it is available on DVD and has already been distributed to libraries and visitor centers in the Bay Area and beyond. A companion outreach program is in development.

The Bay Area has excellent educational institutions, and innovative programs such as virtual Farallon Islands foot tours can be integrated into existing curricula. New opportunities such as Google Oceans can also assist with making the Farallon Islands more accessible to a broader audience.

11.5

To make the Refuge more accessible to not only Bay Area residents, in 2009 we will introduce a multi-day marine sanctuary and wildlife refuge program that includes visits to interpretive centers with a boat tour of the Farallon Islands.

11.6

We believe that a boat tour is an effective, non-intrusive way of experiencing the Refuge first-hand, as long as guidelines and regulations are followed and enforced. From a boat perspective, visitors have close access to thousands of seabirds, seals and sea lions; we see, feel, hear and smell the islands intimately.

Throughout our 25 years experience promoting access to the Farallon Islands, we have explained to the public why we cannot land on the islands, and without exception the public has not only been understanding but fully supportive once they understood the sensitive nature of the Refuge.

Our interpretative staff includes professional wildlife biologists and educators from institutions such as the California Academy of Sciences, the Farallones Marine Sanctuary Association, and the East Bay Regional Park District. Through their collective experience, they have shaped the interpretive program and worked with boat captains to avoid any potential disturbance.

Please consider our educators and biologists comments regarding changing minimum access standards, from the current U.S. Fish & Wildlife Service boat restrictions of 300 feet of most of the shoreline of the Farallon Islands, in relation to their ability to teach and foster a conservation ethic:

- \* "Any extended limits would substantially change the interpretive program. In particular, it would impact members of the general public without binoculars. These are often the people who have the least practical experience with nature observation. Fundamentally, our approach is to foster a conservation ethic among the public by showing them the wildlife resources. For the less-than-experienced, it will be harder to develop an appreciation for the resources if they cannot see them well. When at the SEFI, I mainly do 'directed observation' rather than lecturing. The balance with any new restriction would be pushed in the direction of lecturing as opposed to direct observation. Although I am a Certified Wildlife Biologist with over 25 years of experience leading nature trips to the Farallones (as well as spending time on the island as a research volunteer), I do not have any data on disturbance reactions of the wildlife. Anecdotally, I have not observed any adverse impacts from the current 300-foot buffer. However, if data are available, I would like to review them. Generally, the immediacy of the experience is greater with the smaller buffer. And the quality of the experience, I believe, helps foster a conservation ethic among the participants."
- ➤ "I feel the 300-ft limit is sufficient to protect wildlife at SEFI. I believe the problem is that some boats do not respect the 300-ft limit. I've repeatedly observed boats coming within less than 300 ft from shore even when wildlife onshore are showing clear sings of disturbance (i.e. heads raised, head bobbing, fluttering, etc)."

➤ "Currently the interpretive program is based on what we see --- for example if the restriction was extended to 1000 feet we will not be able to see the concentration of birds or any of the bird behavior and therefore cannot point out any of this. Therefore, the information would focus on what you can't see. It is much more rewarding to show people the 'actual', the 'real life' – seeing the numbers of birds on the islands helps to reinforce the message about conservation of a sensitive area. We are able to get that message across now with the current restrictions --- we mention why we can't go to certain areas and show pictures of the animals that are breeding in those areas i.e. Steller sea lions, Fur seals. With further restrictions there would be no 'wow' moment at seeing thousands of murres shoulder to shoulder surrounded by the tower nests of Brandt's cormorants. Based on my experience with the captains, 300 feet is sufficient. The naturalists and the captains work together to insure that we approach all wildlife with caution, that we do not use the PA system or shout when close to the rocks."

Based on our experience, we believe current restrictions are adequate unless there is conclusive data to support an extended access distance to the Farallon Islands is necessary to protect the 11.8 integrity of seabird colonies and pinniped haul outs. We support the concept of adaptive management including reassessing potential disturbance on a consistent basis. We also recommend that funding be appropriated for enforcement of current restrictions.

In conclusion, we support greater public involvement through activities that advance the goals of the Refuge and benefit conservation. We would be happy to provide further details upon request.

Thank you for the opportunity to comment.

Sincerely,

Birgit Winning

**Executive Director** 

Bugit Winning

- 11.1 Refer to response at 1.2. Boat restrictions will be coordinated with different stakeholders to determine wildlife protection needs.
- 11.2 Refer to response at 1.2.
- 11.3 The final CCP has been revised to include at least one media tour (directed and organized by the Service) in addition to the existing media visits by request. The CCP also includes objectives that include outreach to schools and improved outreach for volunteer needs.
- 11.4 Objective 3.2 specifically addresses partnerships and outreach materials to increase public awareness of the Refuge.
- Objective 3.2 also addressed using educational institutions and a remote camera system to make the Refuge "virtually" accessible.
- 11.6 We agree that boats can offer a non-intrusive experience. Objective 3.1 includes a strategy to improve boater experience by collaborating and training interpretive specialists about the Refuge. Potentially real-time interface between staff on the island and visitors on boats may be implemented.
- 11.7 Boating limits have not been changed in this CCP. Waters near the Refuge are regulated under the state of California and the GFNMS. The issue continues to be discussed under the California Marine Life Protection Initiative, with some input from stakeholders like the Service. We will recommend that consideration be made for tour boats.
- 11.8 The CCP includes components to monitor for boating and aircraft disturbance. The Service will work with partners including GFNMS and CDFG to determine need for extending buffers based on disturbance data. The Service will improve coordination with other partners to share in the enforcement of current restrictions.

Kevin Shipp 02/20/2009 05:03 PM Please respond to dkevinshipp

To: sfbaynwrc@fws.gov

cc:

Subject: FNWR CCP

## Dear Ms. Chan:

Thank for the opportunity to provide comments on the Farallon National Wildlife Refuge ("Refuge") Draft Comprehensive Conservation Plan and Environmental Assessment ("draft CCP/EA"). The Refuge is a national treasure which should be managed in a way that is consistent with the purpose of the Refuge. The purpose of the Refuge is to serve as a "preserve and breeding ground for native birds" and for "wildlife purposes." The protection the Refuge provides benefits many species besides birds, such as marine mammals and great white sharks. In addition, the Refuge plays a vital role in the migration of birds and other species.

The Fish and Wildlife Service has selected Alternative C as the preferred Alternative because they believe that it best achieves the purposes of the refuge. However, there is not sufficient evidence in the draft CCP/EA to support this conclusion. Alternative C includes the development of a visitor service plan to consider on-site visitor opportunities such as tours and volunteer activities. The Refuge currently provides sufficient public use in the form of research opportunities. Allowing tours will likely introduce non-native species, degrade the Refuge's value to wildlife, and diminish the value of the Refuge for future generations. This form of public use is not consistent with the purposes of the Refuge. In addition, there are currently abundant opportunities for the public to get a wildlife experience in the region. What is lacking is wildlife habitat that provides sufficient protection for the species that depend on it. Before public use is allowed a full EIS needs to be circulated for the public to review. Please select one of the other alternatives.

Thank You.

Kevin Shipp 1020 Jackson St. Apt. 504 Oakland, CA 94607

12.1 The development of any visitor services plan would necessitate a comprehensive National Environmental Policy Act analysis to assess impacts. However, given the lack of public interest for access and conservation priorities, the Service has determined not to pursue public access. Refer to response at 1.2.

Sandra Rhoades <
02/20/2009 01:35 PM
To: <sfbaynwrc@fws.gov>

cc:

Subject: FNWR CCP

To whom it may concern:

I am writing to express my concerns over the preferred alternative (Alternative C) in the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan. Alternative B is a very good plan which allows for increased habitat and wildlife protection by providing non-native plant and mouse removal, increased enforcement to prevent disturbance to wildlife, and media access in order to further public education and awareness of this amazing place. These are all consistent with refuge goals to protect and manage island wildlife. However, Alternative C allows for the consideration of on-site visitor opportunities like island tours. While increased opportunities for public awareness of the islands are incredibly important, there are many other ways, especially with today's technology, for people to experience the islands. Opening the island to on-site visitor activities could be detrimental to the wildlife and habitat of the island and goes against the primary goals of the Refuge.

Currently the number of people on the island is minimal. Opening the island to visitors would increase the human traffic on the island and therefore increase the amount of human caused disturbances.

Many of the island's species of seabirds and marine mammals are very susceptible to human disturbance. Murres, cormorants, harbor seals, fur seals, and sea lions, as well as other wildlife are very skittish and easily flushed by humans on foot. Refuge biologists and interns are well trained, familiar with the island, and know how to avoid causing unnecessary disturbance to wildlife. Visitors to the island would not have this knowledge and would be much more likely to cause disturbances.

Habitats needed by wildlife are very fragile. For example, Cassin's and Rhinoceros auklets burrow underground. The burrows are hard to spot (and the extent of the burrow can not be seen) and cave in easily when stepped on, destroying the nesting burrow and possibly trapping adults, chicks, or eggs inside. Asking visitors to remain on trails never works. On Alcatraz Island, I have seen first hand that people do not stay on the trails, even while on guided tours, and signs and fences are no barrier for human curiosity. There are always people who decide to step off the trail and do some exploring on their own, putting wildlife, habitat, and themselves in danger.

The logistics and safety of having visitors on the island doesn't make sense. The increased human presence and construction that would be needed to make access appropriate for tour groups would be stressful to wildlife and destructive to habitat.

Increased educational opportunities through media outlets, web cams, blogs, boat tours, and off-site visitor centers are the best ways to bring the island to the public while preserving the fragile island habitat and protecting wildlife.

Please choose Alternative B for the Farallon National Wildlife Refuge Comprehensive Conservation Plan because keeping the island closed to public access is crucial for the safety of the public and the protection of the Farallon Islands Refuge and its wildlife.

Sincerely, Sandra Rhoades 13.1 Refer to response at 1.2.

alalunga@aol.com 02/23/2009 10:32 AM To: sfbaynwrc@fws.gov

CC:

Subject: Farallon Islands

Winnie Chan,

My name is Capt. Thomas Bernot. I operate whale watching and Farallon Island tours from San Francisco.

Proposing that tourists be allowed to land on the Island would be a huge mistake. I can tell you from first hand experience that the protection of the wildlife on the island and it's inaccessability is a major part of the allure to tourists that visit.

I invite you to experience a tour for yourself, talk to my customers and get a real-world feeling for what is important to eco-tourists.

Although eco-tourism is a broad term, I think you will agree that it does encompass a low impact approach to managing the attractions.

Capt. Thomas Bernot sanfranciscowhaletours.com

14.1 Refer to response at 1.2.



February 20, 2009

Via Facsimile and E-mail

Ms. Winnie Chan
San Francisco Bay National Wildlife Refuge Complex
9500 Thornton Avenue
Newark, CA 94560

Fax: (510) 792–5828 Email: sfbaynwrc@fws.gov

RE: Comments on the Farallon National Wildlife Refuge Draft Comprehensive

Conservation Plan and Environmental Assessment

#### Dear California Fish & Game Commission:

The Golden Gate Audubon Society is writing on behalf of our roughly 9,000 members and supporters regarding the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment ("Draft CCP"). Golden Gate Audubon and its members are dedicated to protecting birds and other wildlife and their habitats in the San Francisco Bay Area.

As an initial matter, Golden Gate Audubon commends the U.S. Fish & Wildlife Service's efforts to develop the Draft CCP. We have been impressed by the attention paid to the best available science in crafting the draft and the management recommendations contained therein.

Golden Gate Audubon is primarily concerned with Alternative C's consideration of onsite, wildlife-related recreation and guided tours. *See* Draft CCP, Object 3.3, p. 93; *see also* Appendix D (*Farallon Draft Environmental Assessment*) at D-11, D-24. We believe that the science available indicates that such use would unnecessarily disturb wildlife and potentially introduce additional stressors on the local populations, including disturbance of foraging, resting, or breeding wildlife and the potential introduction of non-native predators and other animals to the island.

To be certain, many of our members would relish the opportunity to stroll about on the Farallon Islands looking to catch a glimpse of a rare migrant warbler or to observe the spectacular scenes of the breeding auklets or elephant seals. Yet, our members also understand that there are precious few places left where seabirds and pinnipeds may forage, rest, or breed undisturbed. We know that even minor disturbances can further put these species at risk. We believe that the Service's resources are better utilized if focused on protecting the Refuge for native plants and wildlife and developing recreational opportunities elsewhere in the National Refuge system.

15 1

Ms. Winnie Chan February 20, 2009 Page 2 of 2

15.2

Because of these considerations, Golden Gate Audubon cannot support Alternative C as currently written. We ask that the Service either revise Alternative C to remove consideration of the on-site recreational activities or that the Service refocus its efforts on implementing Alternative B.

15 3

Finally, we note that the Draft EA and CCP anticipate only that a visitor services plan would be developed to assess on-site visitor opportunities. Should the Service adopt Alternative C and draft a visitor services plan that provides for recreational visitors to the island, we believe that in order to comply with the National Environmental Protection Act, 42 U.S.C. § 4321 *et seq.*, the Service would have to prepare a supplemental environmental assessment and an environmental impact statement to fully assess the impacts of such recreational visits to the island.

Thank you again for drafting this excellent conservation plan and for considering our comments. If you would like to discuss this matter further, please do not hesitate to contact me.

Sincerely,

Michael Lynes

Conservation Director & General Counsel for

Michael dynes

**Environmental Matters** 

- 15.1 Comment noted. Any activities on the Refuge would be weighed against their environmental impacts.
- 15.2 Refer to response at 1.2.
- 15.3 No recreational public access is expected under Alternative B. Therefore, no environmental assessment is planned.



### Ohlone Audubon Society, Inc.

A chapter of the National Audubon Society Serving Southern Alameda County, CA

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

February 20, 2009

Dear Ms. Chan,

I am writing on behalf of Ohlone Audubon Society to express concern, or perhaps even dismay to learn that The Fish and Wildlife Service would even contemplate opening the Farallon Islands to tourists. A few years ago there was considerable outcry when a ham radio organization wanted to have a gathering at the Farallones.

16.1

A Comprehensive Conservation Plan should be about conservation of resources, not disruption or destruction of the habitat or the species found there. The habitat on the Farallones is extremely fragile and would not be conducive to tourist traffic.

Getting to the island can be hazardous during high seas. Getting people on and the island is a major task as due to difficult landing procedures. Getting tourists off the islands have the same hazards as getting them on. The facilities on the islands are barely adequate for the researchers and the management staff assigned to the islands. Increased human presence would be a real burden.

The Fish and Wildlife Service would make much wiser use of its limited resources managing the Farallones for the many seabirds, seals, and sea lions that have come to rely on the Farallones to nest and breed.

16.2

It is also important to use resources to monitor climate change and availability of food given rise in both temperature and acidity of the ocean water.

Alternative C of the CCP that would allow recreation and tourists on the Farallones is a very bad idea for the birds and other animals that make use of that unique habitat.

Yours truly,

Evelyn M. Cormier, President

Ohlone Audubon Society

31020 Carroll Avenue, Hayward, CA 94544

- 16.1 Refer to response at 1.2.
- 16.2 The final CCP includes Objective 1.7 that addresses the need to monitor for climate change. Objective 1.6 includes strategies to assess foraging ecology of breeding birds on SEFI over time.

"Connie Anderson" < >
02/05/2009 03:55 PM
To: <sfbaynwrc@fws.gov>

cc:

Subject: FNWR CCP comments due Feb 29, 2009

Thank you for allowing me the opportunity to review and comment on the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment.

This Plan, and preferred Alternative selected, adequately characterize, address and recognize the protected status of the State's ocean waters surrounding the Islands known as Farallon Islands Area of Special Biological Significance.

Sincerely,

Constance S. Anderson, Environmental Scientist
Areas of Special Biological Significance,
Ocean Unit, Division of Water Quality
State Water Resources Control Board
916.341.5280
ASBS listserve sign up link:
http://www.waterboards.ca.gov/resources/email\_subscriptions/swrcb\_subscribe.shtml (
http://www.waterboards.ca.gov/resources/email\_subscriptions/swrcb\_subscribe.shtml )

17.1 Comment acknowledged.

Jane Kriss <>

02/04/2009 11:57 AM Please respond to jane To: sfbaynwrc@fws.gov

cc:

Subject: Farallon National Wildlife Refuge

To whom it may concern:

I would like to make the following feedback regarding the Farallon National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment:

- 18.1 1. The Comment Period needs to be extended to 90 days.
  - 2. An Environmental Assessment is inadequate to be making these decisions.

As a resident of Inverness, CA, this issue concerns me.

Sincerely, Jane Kriss

- 18.1 Comment acknowledged.
- 18.2 An EIS was not developed for this CCP. The CCP is a programmatic document that provides an overview of what activities would be conducted in the next 15 years. Certain activities may need further environmental review and will be conducted as needed, such as an environmental review for the mouse eradication project.

Deasy Lontoh

01/29/2009 04:58 PM To: sfbaynwrc@fws.gov

cc:

Subject: FNWR CCP

29 January 2008

Winnie Chan, Refuge Planner, Farallon CCP San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Dear Ms. Chan:

I am writing to express my concerns about Alternative C in Farallon CCP, particularly regarding on-site public visits. The Farallon Islands host hundreds of thousands breeding Common Murres, which lays a single egg.

They are very sensitive to human-caused disturbance, and it takes only one disturbance event that caused loss of eggs or chicks to wipe out one year's productivity. Long-term effects of human disturbance on seabird population are not well-understood, but it is certain that multiple disturbance events over many years will have significant impacts on the islands' murre populations and statewide.

Moreover, on-site visits will cause habitat loss and degradation. Building infrastructures to accommodate visitors safely on the Islands will cause habitat loss. And pollution will plague the Islands and surrounding environment. Trash on the islands, fuel in the water, and exhaust in the air will degrade the ecosystem.

19.2

19.1

Knowledge gained from long-term research on seabirds and pinnipeds of Farallon Islands have been crucial in understanding the complexity of the marine ecosystem. On-site visits will jeopardize the environment in which these studies take place and the research themselves.

I believe opening the Farallon NWR to the public is not consistent with principles of conservation. Aldo Leopold wrote, "Conservation is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth." Harmony will not be achieved by allowing on-site public visits, only disturbance to wildlife and ecosystem degradation. I urge you and the managers of the Farallon NWR to take Alternative C out of the final CCP. Public appreciation the Farallon Islands can be achieved at much lower cost to the environment.

Sincerely,

Deasy Lontoh

- 19.1 Comment acknowledged. The CCP includes elements to study the effects of long-term disturbance to wildlife.
- 19.2 Refer to response at 1.2.
- 19.3 Alternative B is the preferred alternative.

"Emilie Strauss" 02/05/2009 06:28 PM To: <sfbaynwrc@fws.gov>

cc:

Subject: FNWR CCP

Dear Ms. Chan,

I am submitting Comments on the Draft Farallon National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment. I am fortunate to have spent three separate sessions at the Farallon NWR as a volunteer field biologist with the Point Reyes Bird Observatory.

Thank you for extending the comment period.

I support the continued protection of seabird and marine mammals and their predators, and the continued monitoring of these populations.

However, I strongly disagree that a visitor services plan be developed for on-site use. As you know, access to Farallon NWR is very dangerous. marine mammal and seabird populations are extremely susceptible to disturbance. A few examples of human disturbance could include mass fly-offs of common murres allowing gulls to predate their nests, and mass exodus and trampling of California sea lions. There are no seasons during which vulnerable and sensitive wildlife populations are not present on the islands (I have been on the island during August, December, January, and April). There are almost no areas where humans can trespass without impact.

Thank you for preserving the ongoing programs at Farallon NWR.

Sincerely,

Emilie Strauss 1606 Hearst Ave. Berkeley, CA 94703

20.1 Refer to response at 1.2.

02/08/2009 06:47 AM To: sfbaynwrc@fws.gov

cc:

Subject: FNWR CCP

February 8, 2009

To: Ms. Winnie Chan, Refuge Planner

Farallon NWR CCP, San Francisco Bay NWR Complex

Email: sfbaynwrc@fws.gov

Subject: FNWR CCP

Dear Ms. Chan:

I am writing about the Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for the Farallon National Wildlife Refuge.

I am strongly against any plan that allows on-site public use, such as guided tours, of the Farallon Islands. The Farallon Islands is the largest seabird breeding colony in the United States. I do not believe that in-site visits from the public would help the seabird breeding colony. In fact, public visitors would have to negatively affect the breeding colony.

Please do not proceed with any plan that allows public access to the Farallon Islands.

Thank you for your attention.

David Rice 1470 Keoncrest Drive Berkeley, CA 94702

21.1 Refer to response at 1.2.



# UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NATIONAL OCEAN SERVICE

Gulf of the Farallones National Marine Sanctuary 991 Marine Dr., The Presidio San Francisco, CA 94129

February 3, 2008

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Ave. Newark, CA 94560

#### RE: Request for extended comment deadline on the Draft Comprehensive Conservation Plan

Dear Ms. Chan:

The Gulf of the Farallones National Marine Sanctuary (Sanctuary) manages the waters adjacent to the Farallon Islands to the mean high tide. The Sanctuary is charged with protecting Sanctuary resources and qualities, working in collaboration with other agencies that either share our boundaries or share our resources. The National Marine Sanctuaries Act mandates maintaining natural biological communities; and protecting, and where appropriate, restoring and enhancing natural habitats, populations, and ecological processes.

Our agency shares management responsibility of the same marine biological resources of the Farallon Islands and we want to ensure that we focus adequate time on reviewing and commenting on the Draft Comprehensive Conservation Plan (CCP). It is important that we continue to work together to protect the marine ecosystem, and to that end, we respectfully request an extension of the comment deadline until at least one week later, February 27, 2009, in order to allow us the additional time we need for a comprehensive review process.

We ask you to consider our request for the following reasons:

- Since the CCP will guide the management of the Farallon National Wildlife Refuge for the next 15 years, and a long-term plan needs substantial time for public comment. For example, the Office of National Marine Sanctuaries published a draft 5-year management plan for the Sanctuary and provided the public a 90-day comment period.
- 2) The CCP was released on December 22, 2008, three days prior to a two-day federal holiday in December, followed by an additional federal holiday on January 1, 2009, and two additional federal holidays, on January 19 and February 16, 2009 that will result in a total of 5 federal holidays during the comment period, which is equal to one workweek.
- 3) The CCP was mailed to our office, but I did not receive it until January 5, 2009. Staff were not able to start the review process until more than two weeks after the release date.

Thank you for your consideration. If you have any questions, please do not hesitate to contact Karen Reyna at (415) 561-6622 or by email at <a href="mailto:karen.reyna@noaa.gov">karen.reyna@noaa.gov</a>. Thank you.

Sincerely,

Maria Grown

MARIA BROWN Superintendent

22 1

22.1	Request for extension was granted and the comment period was extended for an additional 30 days.

February 6, 2009

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Re: Request for 30-day Extension to Comment Period for Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan,

We are writing to request an extension to the 60-day comment period for the Farallon National Wildlife Refuge (Refuge) Draft Comprehensive Conservation Plan and Environmental Assessment (D-CCP/EA). Because of the gravity of the potential changes included therein, because the D-CCP/EA was released just before the December holidays, and because many 23.1 interested parties have still not gained access to the document for review, lwe believe a 30-day extension is warranted.

The Farallon Islands support the largest breeding seabird colony in the contiguous United States. The Farallones act as a source population for over a dozen species, which support the long-term health of regional populations, including a large number of bird and mammal colonies on the mainland. Because these species are highly sensitive to small human disturbances and climactic changes, great care must be taken to preserve and enhance the value of existing highly protected habitat on the Farallon Islands. Existing protections have been integral to protection and/or recovery of the myriad species that call the Farallones home.

Because of the sensitivity of local species, it is critical that all interested parties and members of the public have sufficient time to analyze the potentially harmful changes contained in the D-CCP/EA. Specifically, we request that you extend the comment period from 60-90 days for the following reasons:

- 1. Since the Draft Comprehensive Conservation Plan Environmental Assessment will guide agency decisions for the next 15 years, the public and affiliated agencies deserve adequate time to review and comment on it. There should be no rush in approving the proposed substantial changes to the existing long-term plan, especially when current management has been very successful.
- 2. The D-CCP/EA was released on December 22, just a few days before the Christmas, Hanukkah, and New Year's holidays, making it likely that many interested parties were unaware of or unable to review the proposed alternatives and analysis in a timely manner under the existing deadline.
- 3. Many people who have requested electronic and paper copies of the D-CCP/EA, both before and after the beginning of the existing comment period, have yet to receive the required documents. Others have had trouble downloading the document from the U.S. Fish and Wildlife Service website due to the extremely large file size and are still unable to review it.

23.1

For these reasons, we request that you extend the comment period for an additional 30 days. With this amended deadline, the public should have adequate time to assess and comment on the sweeping management changes proposed in the D-CCP/EA.

23.2

Furthermore, we request a public outreach effort comparable to what's been undertaken in similar recent D-CCP processes. Public meetings were held as a part of the Desert Complex, NV (six meetings in August 2008) and Humboldt Bay, CA (scheduled for March 2009) D-CCP processes. We request that the USFWS hold at least one public meeting for the Farallon Islands D-CCP in San Francisco to allow broad local public participation.

Thank you for considering our request. If you wish to discuss the matter, please contact Frederick Smith at (415) 663-9312 or email to eac@svn.net.

Sincerely,

Frederick Smith

Executive Director Environmental Action Committee of West Marin Point Reyes Station, CA

Kaitlin Gaffney

Director of Pacific Ecosystem Protection Ocean Conservancy San Francisco, CA

Neal Desai Senior Program Manager, Pacific Region National Parks Conservation Association San Francisco, CA

Nona Dennis President Marin Conservation League San Rafael, CA

Barbara Salzman President Marin Audubon Mill Valley, CA

Terri Watson Executive Director Farallones Marine Sanctuary Association San Francisco, CA

- 23.1 23.2 Refer to response at 22.1.

  Due to staffing and funding constraints, additional public meetings were not held.

February 20, 2009

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Re: Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan,

Please accept the following comments regarding the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan on behalf of Environmental Action Committee of West Marin, Ocean Conservancy, National Parks Conservation Association, Sierra Club Marin Group, Sierra Club San Francisco Group and Marin Conservation League. Our organizations are dedicated to the long-term protection of California's coastal habitats and wildlife generally and are specifically interested in effective continued protection of the Farallon Islands. We are writing to endorse Alternative B and oppose plans to open the Farallons National Wildlife Refuge to public visitation as proposed in the Preferred Alternative C.

In summary, our letter addresses the following key points:

∞ The Farallon Islands represent an exceptionally important and sensitive wildlife habitat area.

- ∞ Alternative B in the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan is the best option for protecting wildlife and habitat values.
- ∞ Expanded on-island visitor services are not consistent with protection of the Farallon National Wildlife Refuge and should not be considered.

## The Farallon Islands represent an exceptionally important and sensitive wildlife habitat area.

The Farallon Islands are home to the largest seabird and marine mammal colonies in the continental United States south of Alaska. In addition to being an extraordinary habitat in its own right, the Farallon Islands provide a source population for over a dozen species, which support the long-term health of regional wildlife populations, including a large number of bird and marine mammal colonies on the mainland. Negative effects to seabird and pinniped populations on the Farallon Islands due to human disturbance could therefore have cumulative negative impacts on regional populations of these species. Because many of these species are highly sensitive to small human disturbances and climactic changes, great care must be taken to preserve and enhance the value of existing highly protected habitat on the Farallon Islands.

Established as a National Wildlife Refuge in 1909, the Farallon Islands and the surrounding ocean has been recognized by the United Nations and the U.S. government as a site of hemispheric and national ecological significance through the designation of an International

Biosphere Reserve and the creation of the Gulf of the Farallones National Marine Sanctuary. In recognition of the diversity of marine habitats and ocean wildlife on and around the Farallon Islands, the State of California is currently in the process of creating three new marine protected areas and two special closures designed specifically to protect wildlife. The surrounding Gulf of the Farallones (GFNMS) is home to 36 species of marine mammals, four species of sea turtles, and 94 species of seabirds—including 26 threatened and endangered species. Given its high ecological value, the Farallon Islands warrant a management plan that clearly prioritizes wildlife and habitat protection.

Alternative B in the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan is the best option for protecting wildlife and habitat values.

With regards to the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan, we urge adoption of Alternative B. Alternative B is the best choice because it places emphasis on improved natural resource management, expanded scientific study and improving educations opportunities for the public in a way that maintains the existing priority on protecting wildlife populations and their habitat.

In particular we support Alternative B's focus on:

1. Implementing a native plant restoration plan.

- 2. Removing and/or rehabilitating excessive human infrastructure to improve bird nesting capacity and success.
- 3. Encouraging expanded scientific study to enhance the protection, and management of native Farallon wildlife populations and their habitat, including the effect of climate change on these species.
- 4. Expanded off-island education and outreach to improve the offshore visitor experience, including the creation of educational materials and interpretive displays, program outreach to partner visitor centers and the installation of a web camera for people to view wildlife in their native habitat.

Significantly, existing protections at the Farallon Islands have been integral to protection and/or recovery of the myriad species that inhabit the islands. Enhancing the focus on restoring the islands to a more native state should improve long-term habitat health and wildlife population viability.

Expanded on-island visitor services are not consistent with protection of the Farallon National Wildlife Refuge and should not be considered.

We support efforts to improve the visitor experience through enhanced public education and outreach. However, such efforts must be fully consistent with habitat and viability of the sensitive wildlife species that the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan aims to protect and enhance. The best way to increase public exposure to and awareness of the Farallon Islands is through educational and interpretive partnerships with mainland organizations and institutions that can provide a window to the Islands from the mainland. For example, interpretive exhibits located at the Point Reyes National

24.2

24.3

24.6

Seashore and Golden Gate National Recreation Area offer opportunities to educate the public about the Farallons Islands without undue risk to wildlife and habitat. Virtual visitation through web cast camera feeds can also enhance the public appreciation of the islands.

We strongly oppose opening up the Farallon Islands to public tours and believe that any attempt to do so would put one of the country's most important wildlife refuges at extreme risk by exposing extremely sensitive wildlife populations to increased human disturbance.

Specifically, we oppose any plans to allow on-island visitor services for reasons including:

- 1. As noted in the Environmental Assessment (EA), almost every piece of habitable space on the Farallon Islands is already being used by the species that inhabit the island. Therefore, any infrastructure for visitation would infringe upon space currently being used for wildlife habitat. The construction site would abut marine mammal haul-outs and seabird breeding colonies.
- 2. The U.S. Climate Change Science Program recommends that one of the most important ways to help species adapt to climate change is to reduce stressors on sensitive species. Considering the already high sensitivity of Farallons Island species to climactic variations and human disturbance, allowing public visitation on the islands themselves would result in an unacceptable risk of adverse impacts to wildlife and would conflict with the ecosystem protection goals of the Wildlife Refuge system.
- 3. As the EA states, non-native species infestation is a serious problem on the islands. Non-native eradication should be a top priority to improve existing habitat. Expanded public tours of the islands would both undermine restoration efforts through trampling, etc. and increase the likelihood of new non-native species introductions though accidental contaminations by visitors, their clothing and their gear.
- 4. There are currently no landings or docks on the islands where near vertical steep cliffs abut navigable depths. Very limited current access is provided by a derrick (crane) and a primitive small craft emergency landing area. Increased public access to the islands themselves would therefore require construction of new landing facilities. Such activities would result in unacceptable disturbance to wildlife during both construction and operation phases.
- 5. The Farallons Islands is coated with bird feces, feathers, and carcasses of birds and prey remnants -- these conditions present a health hazard to public visitors.
- 6. Visitor facilities on the islands are severely limited. There are no functional flush toilets or water sources on the islands. All water is imported. Because there is no wastewater treatment available on the islands; currently, small volumes of wastewater generated by researchers are discharged in to Refuge waters. Any increase in such discharges would be harmful to wildlife and further degrade water quality. New water supply, offloading, storage, and wastewater treatment facilities would have to be constructed to support any additional visitation above current low levels of use by researchers. Constructing such facilities and transporting supplies or waste would be extremely disruptive to island wildlife and would conflict with the ecosystem protection goals of the Wildlife Refuge.

For all of these reasons, we strongly oppose plans to expand visitor use on the Farallon islands.

#### Conclusion

As we have stated above, the Farallon Islands are the most important breeding and nesting grounds for seabirds in the contiguous United States. The National Wildlife Refuge System is a nationwide system of federal lands specifically managed and protected for wildlife and their habitats. The Farallon Islands National Wildlife Refuge is a crown jewel in this nationwide system both in terms of the quality of the resources it contains and the sensitivity of those resources. As such, the Farallons warrant the highest possible level of protection. We believe that Alternative B is the best choice to meet the goals of the Refuge System, improve wildlife habitat, protect native species and provide an appropriate enhanced visitor experience and urge its adoption

If you wish to discuss the matter, please contact Frederick Smith at (415) 663-9312 or email to eac@svn.net.

Sincerely,

Frederick Smith

**Executive Director** 

Environmental Action Committee of West Marin

Kaitilin Gaffney

Pacific Ecosystem Protection Director

Eleva Belsky

Ocean Conservancy

Elena Belsky,

Chair

Sierra Club Marin Group

Neal Desai

Senior Program Manager, Pacific Region National Parks Conservation Association

Becky Evans Chair Sierra Club San Francisco Group

Nona Dennis President Marin Conservation League San Rafael, CA

- 24.1 Comment acknowledged. Refer to response at 1.2.
- 24.2 The final CCP identifies several goals and an array of objectives that support wildlife and habitat protection through improved law enforcement coordination, additional research and monitoring, and habitat restoration.
- 24.3 Alternative B has been selected as the proposed action.
- 24.4 Alternative B expands efforts to focus on native plant restoration, removal of excess infrastructure, and further law enforcement coordination. Refer to response at 24.2.
- 24.5 The CCP identifies several partners include Point Reyes National Seashore, Golden Gate National Recreation Area, Gulf of the Farallones National Marine Sanctuary, PRBO Conservation Science, and the California Academy of Sciences through which to collaborate on outreach and environmental education.
- 24.6 The Service recognizes that there would be several challenges including those mentioned, to providing public access that would need to be further analyzed. Refer to response at 1.2.

25.1

Harry Carter <> 02/10/2009 11:53 AM To cc bcc

Subject

Carter comments related to the Farallon CCP

History:

This message has been replied to.

Hi Winnie,

Thanks for trying to send this to me. I tried to open the CCP through the cno link but couldn't open it. It looks like I won't be able to read it before the deadline. I'll be in Japan at the PSG meeting from 17 February to 4 March. I'll also be very busy before then and when I return. I have two major comments for the CCP that I provide for USFWS consideration below. Please officially submit this email on my behalf into the comments process before the deadline:

- 1) It is imperative that the "Farallon Islands Archive" should be developed at the Bancroft Library at UC Berkeley. This archive would collate, store, and index historical and current documents about the Farallon Islands for future users. This archive should include any general or scientific documents that provide information about the all printed materials, photographs, slides, reports, published papers, diaries, correspondence, newspaper articles, maps, tape recordings, video, movies, etc. All Farallon-related USFWS and PRBO documents should be copied and deposited. It should be housed in the Bancroft Library which has strict policies about access and protection of historical documents which could be specified by USFWS. With such good care of historical documents, this would encourage the refuge, PRBO, U.S. Coast Guard, Pete White, and many past residents and researchers and others to contribute their collections of materials to this archive. To establish this archive, USFWS should contribute: a) funds to the refuge, PRBO, U.S. Coast Guard, GFNMS, and Pete White to copy and provide primary documents from major contributors to the archive; b) a one-time contribution of funds to the Bancroft Library (and discuss any further compensation issues with the library); and c) agree to collate materials from PRBO and others once per year, and submit them to the library with a summary and index. It is absolutely remarkable that such an archive has not been developed before now. For all future management and research activities on the refuge, this archive is critical to preserve original information, to increase ease of access to this information, and to reduce future costs of locating such information.
- 2) A detailed study should be conducted to assess tremendous damage to ground habitats (especially soil and rock) at Southeast Farallon Island caused by human activities over time. These ground habitats are critical for burrow and crevice nesting seabirds. I worked on the island for 4 years (1983-86) without ever realizing just how extensive these damages have been and this is a completely misunderstood and forgotten problem that should be addressed. Various historical review documents (e.g.,

25.2

Ainley and Lewis 1974, Ainley and Boekelheide 1990, White 1995, Carter et al. 2001) also do not do justice to describing this problem. Only through careful review of all historical documents and reconstruction of events with assistance from a specialist (possibly an engineer) in restoring such habitats can one really digest what has happened and what it would take to consider partly fixing it over time. Without such a study, USFWS is hampered by poor knowledge and will make some poor decisions about management actions and restoration as a result. No one currently involved to a great extent with Farallon Islands research and management has reviewed historical documents in detail and it is unlikely that future workers will gain this knowledge without such a study. Many Certain seabird species (i.e., Ashy Storm-Petrel, Leach's Storm-Petrel, Common Murre, Pigeon Guillemot, Cassin's Auklet, Rhinoceros Auklet, and Tufted Puffin) will never recover to former levels if efforts are not made to even partly restore soil and rock habitats. For efficiency, accuracy, and lower cost, I'd suggest that such a study should be conducted after initial creation of the Farallon Islands Archive and deposition of primary materials from key sources. Chances are that this study also would turn up additional primary documents from obscure sources for inclusion in the archive.

Please feel free to contact me if I can help further. Best of luck with the CCP!

Sincerely,
Harry Carter
Carter Biological Consulting
1015 Hampshire Road
Victoria, BC V8S 4S8
Canada
250-370-7031

- 25.1 The Service maintains an archive of various Farallon documents both in electronic and paper format that are available to the public through request. We plan to continue to organize these documents for reference. It is the hope that the CCP serves as a reference document on the history and future of the Refuge.
- 25.2 On the ground human disturbance is not well understood. Wildlife needs will be assessed in the CCP to determine habitat restoration priorities. The Service will consider whether there will be a need to provide additional closure areas to staff access. The long-term dataset will also be reviewed to determine action needs. GIS mapping will also provide information on the movement of species to determine their threats and needs.

Tibby Simon

02/13/2009 04:51 PM To: sfbaynwrc@fws.gov

cc:

Subject: Farallon National Wildlife Refuge

The tentative plan to allow visitors on the bird/animal refuge on Farallon Island is not a good idea, for s many reasons, that I think have ben presented already by people more closely acquainted with the natural environment there.

This is no a area that is available to the ordinary tourist for good reason, being almost totally inaccessible for the average person, and 26.1 is a wonderful sanctuary for the wildlife that has been inhabiting it for so long. Please don't let some hair-brained scheme influence the clear thinking that has prevailed to date. There seem to be so few places left that can be left untouched by human handling or mishandling. I hope your thoughts about these proposals have come to the conclusion that leaving the Farallons as they are is the best solution!.

Tibby Simon 2035 Oberlin St., Palo Alto, CA 94306 (650) 857-1068

26.1 Refer to response at 2.1.

"Peter White" < > 02/13/2009 11:04 AM To: <sfbaynwrc@fws.gov>

cc:

Subject: FNWR CCP

To: Winnie Chang
Refuge Planner
Farallon NMR CCP
San Francisco Bay NWR

Dear Ms Chang,

The following are comments with respect to the Draft Farallon National Wildlife Comprehensive Conservation Plan.

I believe that the portion of the plan that would allow public access to the Farallon Islands in the form of guided tours is ill advised and not consistent with other aspects of the proposed plan. Currently the islands are closed to human visitation with the exception of island caretakers and researchers. Those individuals that fulfill these roles restrict their activities to assure that there is minimal or no disturbance to wildlife. Guided tours given for members of the public would, I believe, result in unnecessary disturbance to wildlife. In addition, it would mount logistical problems of the first order since visitors must be taken onto the island by means of a crane. The process of climbing from boat to Billy Pugh net can only be accomplished by fit and agile individuals. The operation would be ponderous as well as difficult since only a few individuals can be accommodated at a time. The island's wildlife is more easily viewed from tour boats that are able to approach the islands closely with little or no disturbance. In short, why institute a dangerous, difficult, and possibly disruptive operation when the same purpose (i.e. viewing the wildlife) can be better accomplished by tour boat, as is now commonly done?

If you have any questions concerning any aspect of this comment please do not hesitate to contact me.

Peter White 925 229-1714 761 Condor Drive Martinez, California 94553

27.1 Refer to response at 1.2.

02/12/2009 02:55 PM To: sfbaynwrc@fws.gov

cc:

Subject: FNWR CCP

#### Hello:

I established, with Jim Lewis, the biological research station for PRBO on SE Farallon Island in 1971, and was in charge of the Farallon program for PRBO until about 1994. I've spent probably 5-6 years of my life total on the island. We also established a 'management' plan for scientist/visitor use of the island early on, before FWS decided on an official one, which we also mostly devised on FWS' behalf. I've written about 35 peer-reviwed articles directly related to Farallon Island biota, including the monograph (with D DeSante), "The Avifauna of the Farallon Islands, California", and a book (with B Boekelheide), "Seabirds of the Farallon Islands, Ecology, Structure and Dynamics of an Upwelling System Community". Therefore, my comments are based on this experience.

While allowing visitors onto the island via a ferry seems a good idea for public relations, education etc, this would be an ecological disaster, and far more trouble than it is worth, unless visitors were not allowed to travel any farther than the shoreline rocks upon which they landed. That means, step off the inflatable boat, gaze around, and step back on. Of course, persons would be immediately inundated by clouds of kelp flies in most years and immediately want to go back to the ferry boat, thus negating the PR value of the visit. The flies would follow them back to the ferry boat, and be a pest until completely swatted.

Otherwise, any straying from pathways would crush burrows of cavity-nesting seabirds. While breeding activity may be at a minimum during Aug-Nov, the proposed period of visits, it is not totally inactive, especially for storm-petrels. Moreover, crushing even empty burrows, e.g. of auklets, will require effort by the owners to re-make the burrow. That is effort they should not be forced to make. In fact, the auklets continue to visit their burrows year round, though much more sporadically during autumn. Right now, the populations of certain nesting species, such as auklets, are at a decadal minimum, but it should not be assumed that that state of affairs will continue indefinitely. Some day, again, the auklets could be 'everywhere', unlike the impression one might get at present.

The same sorts of diurnal species viewable on the SE Farallon during the fall can be viewed at places along the mainland, e.g. Pt Reyes. Therefore, I suggest greater interpretive effort be made in the vicinity of the Pt Reyes Lighthouse rather than pursuing this idea of visits to land on the Farallon Islands.

Sincerely, David Ainley

105 Headlands Court Sausalito CA 94965 415.332.5718

- 28.1 Refer to responses at 1.2 and 24.6.
- 28.2 Under the proposed action, Alternative B, off-site public outreach and interpretation opportunities will be pursued with partners including Gulf of the Farallones National Marine Sanctuary, California Academy of Sciences, and Point Reyes National Seashore.

"Mears, Haley"
02/25/2009 05:15 PM
To: <sfbaynwrc@fws.gov>

cc:

Subject: FNWR CCP

To Whom It May Concern:

I am writing to comment on the proposed Farallon National Wildlife Refuge Comprehensive Conservation Plan. I understand that in objective 3.3 the plan talks about investigating opportunities for eco-tourism, providing guided walking tours, wildlife photography, wildlife observation, interpretation, etc. on the Refuge, and on the Farallon Islands themselves. I would like to state that I strongly feel that the Farallon Islands are an invaluable natural resource as a tremendous breeding ground for all manner of birds and sea life, and an integral part of the surrounding ecosystem. As such, I do not believe that they should be opened t the types of ecotourism and human traffic that are proposed in the plan. Such activity would inevitably disturb the wildlife of the islands, and also in all probability cause irrevocable damage to the habitat itself. I recognize that in order to raise awareness about the importance of such natural resources often eco-tourism can seem like a natural solution. However, I also believe that there are alternative, less intrusive and disruptive means of achieving the same goals of granting public access in one form to the islands than actually allowing human tourism. With the technological age in which we live, I am positive that the same financial resources that would be devoted to setting up the walking tours, wildlife observation, and other eco-tourism activities could easily be devoted to environmentally responsible film crews, photographers, and artists who could bring the islands to life and to the public through the media and the internet in ways that would allow people to witness and in some way participate in the splendor of the refuge while maintaining its natural integrity.

The Farallons are an important and mythic piece of the culture of Northern California and the Bay Area, not to mention a terrifically productive and vital natural resource, and we must act to protect it accordingly. Please do not allow eco-traffic on the islands themselves, and please carefully consider and utilize evidence-based research when considering increased vessel traffic in the surrounding Sanctuary waters.

Thank you, Haley

Haley F. Mears, MSW
Child Welfare Worker II-Bilingual
Marin County Department of Health and Human Services
Children and Family Services
W. Marin Human Service Center
P.O. Box 331/ 100 6th St.
Pt. Reyes Station, CA 94956
Tel.: (415) 473-3806
Fax: (415) 473-3828

- 29.1 Refer to response at 1.2.
- 29.2 Media tours, a remote camera system, and web-based public outreach are included in Alternative B.
- 29.3 Under the California Marine Life Initiative, vessel traffic will be assessed by various stakeholders to determine if additional buffer periods and distances are necessary.

Chris Mobley

02/26/2009 10:12 AM To: sfbaynwrc@fws.gov

cc:

Subject: comment regarding eco-tourism access to Farallones

I am in support of this idea. If it is properly managed, the impacts to the environment will be minimal and will not significantly increase the disturbance levels beyond those already created by the presence of scientists and managers. These impacts will be greatly outweighed by the opportunity to connect people to the beauty of the Farallones and build a strong constituency for ensuring their long-term protection. If we want to save a place like the Farallones, we must provide opportunities for people to see the real place with their own eyes.

Thad Mobley Summerland, California

February 26, 2009

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Dear Ms. Chan,

We are writing to comment on the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment (CCP). We have been very fortunate to have been leading natural history trips to the Farallones for close to 25 years (Carol) and 18 years (Doreen) and to have educated thousands of members of the general public on the unique characteristics of the Farallones and their importance to the central California marine ecosystem. The primary focus of these trips has been to connect people to the amazing wildlife on and near the Farallones and within the Gulf of the Farallones National Marine Sanctuary and inform them of research and conservation. On the occasional days when no whales are seen, people commonly state that they were thrilled to just see the islands and associated wildlife.

Overall we support the CCP description of the refuge, its resources, ongoing research and education programs and current management approaches as well as alternatives for future management. However, we do have a major concern with part of Alternative C suggesting assessment of on-site wildlife dependent recreation, including guided tours. Conducting public tours could pose serious risks to the sensitive wildlife populations through excessive human disturbance. Historically, the Farallones have been impacted by wide scale hunting, egging, harassment of wildlife, and introduction of non-native predators. Most species have suffered some declines due to human disturbance and these human disturbances both threatened and reduced Farallon wildlife populations until action was taken by USFWS and PRBO to significantly reduce human impacts to the islands and their resources. These actions included controlling or eliminating introduced species, reducing impacts of research on sensitive areas, placing limitations on the numbers of island personnel, establishing biologically sensitive closed areas, and educating the public about the impacts of human disturbance to the islands and wildlife.

The Farallones are not only an important breeding and haul out site for five species of pinnipeds, but also have the largest number of breeding seabirds at a single colony in the contiguous United States. Because both marine mammals and seabirds are extremely sensitive to disturbance, this National Wildlife Refuge is all about protecting the wildlife. Increased public access could result in impacts on sensitive habitats such as burrows for cavity nesting seabirds through trampling and the introduction of non-native species that may threaten native species.

Another important factor to breeding success is responses to recent climate variability and this stressor, combined with public tours and wildlife-dependent recreation on the island would likely significantly increase overall stressors.

Furthermore, the Farallon Islands and surrounding waters were recently declared a Marine Protected Area. As a result, boat access has been limited near the islands in order to limit human disturbance on the wildlife. Allowing tourism on the island would counteract this conservation effort.

31.4

One final issue that is also a concern is safety. Landing conditions are very extreme and potentially dangerous and the combination of unsafe landings and physical challenges associated with being lifted by a crane onto the island could create significant potential liabilities with increased human impacts.

31.5

We believe educating the public from a boat from a respectful distance around the island has worked remarkably well and strongly recommend this approach for all future tourism. We also support the refuge's general public outreach goals that could be met through more educational activities with visitors to the surrounding island waters.

Sincerely,

Carol A. Keiper, M.Sc.

Carda Kup

Marine Naturalist and Ecologist

Doreen Moser Gurrola M.Sc.

August Moser Harrola

Naturalist

- 31.1 Comment acknowledged.
- 31.2 Refer to response at 1.2.
- 31.3 In the proposed Alternative B, the Service has added objectives to monitor the effects of climate change on refuge wildlife and resources.
- 31.4 Refer to response at 1.2.
- 31.5 Alternative B includes objectives to coordinate with charter boat operators to improve interpretation on boat tours and conduct trainings with docents and interpretive specialists, as well as potentially interface with tours as they visit the islands.

Dear Winnie,

Thank you for the opportunity to comment on the draft Farallon NWR CCP. While it is well written and supportive of the wildlife first mission of the National Wildlife Refuge mission, there are a number of items that require some input on my part. Most of them are very minor typo category corrections. A few of them deal with decisions made in the preferred alternative. I've provided a detailed list below.

P1: (Summary of Alternatives). Change 3 to 4 describing the number of alternatives.

P28: 4<sup>th</sup> paragraph contradicts page 10 about murres relaying.

P29: Paragraph 3 has a different estimate of historic murre numbers then P11. I recall the 400,000 number being used to suggest a minimum estimate from the Ainley papers.

P40: paragraph 3 states Leach's population size has not been estimated. Later in the same paragraph it gives an estimate that the Farallon population of Leach's is 11% of the CA breeding population. How can you make the 11% estimate if the Farallon population size has not been estimated?

P44: Change "ware" to "were".

P44: Insert a space between "since" and "1995."

P45: Insert "there" between "that" and "were" or re-word to "...more birds rafted in the..." and delete "that were."

P93: While the public outreach aspect of the CCP is commendable, guided tours or other forms of onsite wildlife dependant recreation that will be considered in the preferred alternative contradict the purposes for which the refuge was established, objective 1.2, and statements made in the rationale portion of objective 3.3. Allowing guided tours can only have negative consequences for wildlife. It takes a significant amount of refuge and PRBO staff to conduct even a small tour. Many boats trips are cancelled before departure or arrive at the island only to find landing conditions unsafe, requiring the boat to return to the mainland without unloading. There is a number of reasons not discussed in the CCP why guided walks for the general public. The only wildlife opportunity not readily available locally on the mainland is the high density of nesting seabirds during the summer. All of these species are easily seen from boats during the same time of year. In addition, the aggression of nesting gulls (dive bombing and vocalizations) makes the summer Farallon experience somewhat unpleasant. Untrained members of the public have a very high probably of causing an unintentional mortality event for western gull chicks by causing chicks to run into a neighboring gull's territory. Visitors may also wander

32 2

off the paths which will almost certainly result in crushing Cassin's auklets burrows. Elephant, harbor seals, and CA sea lions can be seen a numerous locations close by on the mainland. Fur seals and Steller sea lions are usually found only on West End and thus would not be seen by a tour. The fall landbird migration can be spectacular, if you catch the right day. There is only a small handful of days each year with a large diversity of migrating birds. On most days the songbird population consists of species readily found on the mainland such as white-crowned sparrows, fox sparrows, and western meadowlarks.

Public opinion was clearly against allowing access to Farallon NWR during the Pombo-Rahall bill that was introduced in 2005. Allowing public tours to be considered as a result of a FWS prepared planning document will not help FWS maintain it's credibility with the public and further the perception of the disconnect between the public and the government that serves the public.

Congratulations on nearing the finish line of the Farallon CCP, and thank you for the opportunity to comment.

Sincerely,

Jesse Irwin

853 Ash Avenue

Holtville CA 92250

760-356-2291

jesseirwin@sbcglobal.net

- 32.1 Revisions made.
- 32.2 Refer to response at 1.2.

37303 Davey Jones Dr. Greenbackville, VA 23356 clyde\_joelle@verizon.net February 17, 2009

San Francisco Bay NWR 9500 Thornton Ave. Newark, CA 94560

Dear CCP staff:

Thank-you for sending me a copy of the Draft Farallon CCP for review. Refuge staff and partners who assisted should be commended for the thoroughness of the Plan. I appreciate the amount of effort and perseverance it took to reach this stage. The Plan's Goals and Strategies are well articulated and address important priority needs for managing, protecting and enhancing wildlife habitat on the Refuge. Continued progress on eliminating invasive weeds and reducing the impact of past human disturbance, such as removing non-native house mice, are important strategies outlined in the Plan. Working with existing partners and expanding partnerships is important, and this is also a prominent feature of the CCP.

Despite all that is right with the Draft Farallon CCP, one glaring wrong is the inconsistency of selecting Alternative C as the Service's preferred alternative. Under Alternative C, on-site public guided tours would be evaluated in a Visitor Service Plan. Most of the document (rightly so) stresses how fragile and vulnerable to human disturbance the wildlife is. Why is additional human visitation even being considered when according to page L-3, "Past human use on Southeast Farallon Island severely decreased seabird and marine mammal populations, extirpating some species?" Populations have taken decades – even centuries – to rebound, and most have not yet fully recovered their historic numbers. Northern fur seals, once numbering in the tens of thousands, took over 100 years to begin pupping on the island following their extirpation. When they did return, they selected the most secluded area on West End, where even research staff rarely goes.

33.1

It would be impossible to make public tours compatible with Refuge purposes given the accurate description on D-8 that, "Nearly every square foot of SFI is utilized for nesting, roosting, pupping, or as a haul-out site." In fact, public access is considered downright dangerous, according to page D-7: "Embarking onto SEFI can be challenging, is weather dependent, and requires special equipment. These demands, together with the uncertainties involving equipment reliability, make access dangerous for the public."

The 1997 Improvement Act mandates the Service to facilitate wildlife-dependent public uses at refuges when it is compatible with the conservation of fish, wildlife and plant resources. Substantial wildlife-dependent public use already takes place at the Farallon NWR in the form of over 3,000 visitors per year who take part in Farallon Natural History cruises operated by several boat tour operators in the San Francisco Bay Area. During the 12-years I held the position as Farallon Refuge Manager, I was a passenger on many of these cruise boats. I interacted with many of these visitors, and most (except for the seasick ones) were happy with the boat-based experience of the Refuge, and were grateful for the access restrictions once they understood the reasons for them.

33.3

Over my 12 years as manager, I was able to observe certain wildlife populations gradually move back into areas that they had been absent from for decades. One example is the fur seals noted above. Another is the gradual movement of additional seabird colonies (e.g. Brandt's cormorants, common murres, and wintering brown pelicans) and marine mammals onto the Marine Terrace as the island staff reduced its activities in these areas. Since the movement of wildlife into formerly occupied areas is very slow and still occurring, I am concerned about the CCP's naïve intent (on p. 93) to, "Use existing data on wildlife impacts and resource needs of current human activity on the Refuge to develop compatible public use parameters." First, I'm not sure what this exactly means. But, more important, how will you be able to set a new (higher) level of acceptable human disturbance when the wildlife of the island is still recovering from past human activities? Conversely, how will you be able to evaluate if increased public visitation is having an impact?

What makes the Service's selection of Alternative C even more perplexing it that there is no public constituency clamoring for public access. In fact, the opposite is true. The public generally supports leaving the Farallon Refuge off-limits to human visitors. Several times during my tenure as Farallon Refuge Manager (1996-2008) the question of public access was debated. The most intense was between 2004 and 2005, when a group of HAM radio operators wanted access to the island, and a Bill was introduced in Congress that would have mandated a period of public visitation to the Refuge. Local elected officials were so bombarded with outcries of concern from their constituents that the San Francisco Board of Supervisors and the State Assembly held a joint public hearing. Over 50 people attended and everyone that spoke opposed allowing public access. The U.S. Representatives sponsoring the Bill swiftly withdrew it.

The CCP outlines many innovative and far less intrusive ways of enhancing the public's connection and appreciation of the Farallon Refuge, such as remote web cameras, interfacing with existing tour operators, and increasing off-site exhibits and education. Please emphasize these, drop the guided public tours, and put wildlife first!

Some minor editorial comments:

- P. 84 1st Strategy: Should read, "Develop and implement......"
- P. 88 Last Strategy: Suggest, "Conduct investigations, such as population viability assessments, to understand...."
- P. 89. Table 9 Budget does not include costs for the house mouse eradication
- J-6 2<sup>nd</sup> Bullet: "No more than one six visits between..." Should the word "one" be deleted?
- Appendix M. The budget on Table 4 of this Appendix has been updated see the budget for the house mouse eradication submitted to the Luckenbach Trustee Council.

Again, thanks for the opportunity to comment. And, a big Happy 100th Birthday to the Farallon National Wildlife Refuge!!!

Sincerely,

Joelle Buffa

- 33.1
- 33.2
- Refer to response at 1.2. Refer to response at 31.5. Comment acknowledged. Refer to response at 1.2. 33.3
- Revisions made. 33.4

Pam Fabry < >

03/15/2009 03:12 PM To: sfbaynwrc@fws.gov

cc:

Subject: Re: Farallon National Wildlife Refuge Draft Comprehensive

Conservation Plans

Dear Ms. Chan:

In Brief:

The Farallon Islands represent an exceptionally important and sensitive wildlife habitat area.

Alternative B in the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan is the best option for protecting wildlife and habitat values. Expanded on-island visitor services are not consistent with protection of the Farallon National Wildlife Refuge and should not be considered.

Please consider seriously the above comments. In these times of environmental peril, no chance to preserve and protect very sensitive wildlife areas should be missed.

Thank you.

Pam Fabry Box 719 Bolinas, CA 94924

MaryAnne Flett <> 03/12/2009 09:32 PM To: sfbaynwrc@fws.gov

Subject: Re: Farallon National Wildlife Refuge Draft Comprehensive

Conservation Plan

March 12, 2009

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Re: Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan,

I am writing to endorse Alternative B and oppose plans to open the Farallons National Wildlife Refuge to public visitation as proposed in the Preferred Alternative C.

The Farallon Islands provide exceptionally important and sensitive wildlife habitat for the largest seabird and marine mammal colonies in the continental United States. Many of these species are highly sensitive to small human disturbances and climactic changes, and so great care must be taken to preserve the currently protected habitat on the Farallon Islands.

I am a professional wildlife biologist, and have reviewed the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan. It is my opinion that Alternative B is the best option for protecting wildlife and habitat values because it places emphasis on improved natural resource management, expanded scientific study, and improving educational opportunities for the public in a way that maintains the existing priority on protecting wildlife populations and their habitat.

- It is essential to enhance the protection, and management of native Farallon wildlife populations and their habitat, including the effect of climate change on these species. These populations are already stressed by changes in upwelling and declining fish populations which support wildlife on the Farallons. Rather than allowing public access on the islands, I believe that a better solution to contributing to public awareness and appreciation of the islands would be to improve and expand educational outreach and off of the islands by creating educational materials and interpretive displays and installing a web camera for people to view wildlife at visitor centers on the mainland.
- The focus of the plan for the Farallon islands should be to restore native habitat to improve habitat, therefore contributing to the health and viability of the islands' wildlife. Expanded on-island visitor services are not consistent with protection of the Farallon National Wildlife Refuge and should not be considered.
- I strongly oppose opening up the Farallon Islands to public tours and believe that any attempt to do so would put one of the country's most important wildlife refuges at extreme risk by exposing extremely sensitive wildlife populations to increased human disturbance.

Thank you for considering my point of view.

Sincerely, Mary Anne Flett

- 35.1 Comment acknowledged. Each of the alternatives prioritizes habitat management and wildlife conservation while also allowing for public opportunities when compatible. Refer to response at 1.2.
- 35.2 We concur. Refer to response at 16.2.
- 35.3 The final CCP emphasizes public outreach off-site and the use of a remote camera system to "virtually" connect people to the Refuge.
- 35.4 The CCP emphasizes habitat restoration to benefit the recovery of wildlife. The potential visitor services activities prescribed in Alternative C would have been evaluated for consistency with wildlife and habitat protection priorities.
- 35.5 Comment acknowledged. Refer to response at 1.2.

stacey pogorzelski < >
03/12/2009 07:15 AM
To: <sfbaynwrc@fws.gov>

cc:

Subject: farallon islands visitation

hello

please do not allow public visitation to the farallon islands. as a birder watcher, i know how valuable the islands are for nesting and resting for many species of birds as well as marine mammals. in I support of Alternative B, which would expand habitat restoration and off-shore public education opportunities, while keeping the islands disturbance free to allow our wildlife colonies to thrive.

nature needs some areas that are off limits to humans.

thank you stacey pogorzelski 98 la costa ct novata ca 94947

Windows Live™ Contacts: Organize your contact list. Check it out.

36 1

36.1 Comment acknowledged. Refer to response at 1.2.

Ellen Holmes < > 03/11/2009 10:47 PM To: sfbaynwrc@fws.gov

cc:

Subject: Farallon National Wildlife Refuge Conservation Plan

Dear Ms. Chan,

The Farallon islands are an exceptionally important and sensitive wildlife habitat area. I am writing in support of Alternative B, which would expand habitat restoration and off-shore public education opportunities, while giving maximum protection to the sensitive opportunities, while giving maximum places.

wildlife on the Islands. Because human activities would create disturbance to the wildlife on the islands, I strongly oppose Alternative C, which would open the Farallons Wildlife Refuge to public visitation. Please choose Alternative B.

Thank you,

Ellen Holmes 3053 Fillmore Street San Francisco, Ca 94123

Michael Ellis < > 3/12/2009 07:48 AM To: sfbaynwrc@fws.gov

cc:

Subject: Farallons

To whom it may concern:

Absolutely NO visitation should be allowed on the Farallons. It is a very fragile environment and of course I would love to go on a tour but the environmental price is way too high. Thank you.

Sincerely,

Michael Ellis 1275 4th St. #311 Santa Rosa, CA 95404 707 570-2187 biz@footlooseforays.com

3/11/2009 09:27 PM To: sfbaynwrc@fws.gov

cc:

Subject: Farallon National Wildlife Refuge Draft Comprehensive

Conservation Plan

March 11, 2009

Ms Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Re: Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan,

I am writing to endorse Alternative B and oppose any plans to open the Farallons National Wildlife Refuge to public visitation as proposed in the Preferred Alternative C.

The Farallon Islands represent an exceptionally important and sensitive wildlife habitat area and are home to the largest seabird and marine mammal colonies in the continental United States south of Alaska. Negative effects to seabird and pinniped populations on the Farallon Islands due to human disturbance could impact the regional populations of these species. Because many of these species are highly sensitive to small human disturbances and climactic changes, great care must be taken to preserve and enhance the value of existing highly protected habitat on the Farallon Islands.

Alternative B in the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan is the best option for protecting wildlife and habitat values. Any expansion of on-island visitor services is not consistent with protection of the Farallon National Wildlife Refuge and should not be considered.

I strongly oppose opening up the Farallon Islands to public tours and believe that any attempt to do so would put one of the country's most important wildlife refuges at extreme risk by exposing extremely sensitive wildlife populations to increased human disturbance.

Very truly yours:

Ed and Marcia Nute 4 Laruelwood Court San Rafael, CA 94901 415-457-9241 enute@sonic.net

03/12/2009 08:57 AM To: sfbaynwrc@fws.gov

cc:

Subject: Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan,

We are writing to endorse Alternative B and oppose plans to open the Farallons National Wildlife Refuge to public visitation as proposed in the Preferred Alternative C. With regards to the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan, we urge adoption of Alternative B. Alternative B is the best choice because it places emphasis on improved natural resource management, expanded scientific study and improving educations opportunities for the public in a way that maintains the existing priority on protecting wildlife populations and their habitat.

40.1

We strongly oppose opening up the Farallon Islands to public tours and believe that any attempt to do so would put one of the country's most important wildlife refuges at extreme risk by exposing extremely sensitive wildlife populations to increased human disturbance.

The Farallons warrant the highest possible level of protection. We believe that Alternative B is the best choice to meet the goals of the Refuge System, improve wildlife habitat, protect native species and provide an appropriate enhanced visitor experience and urge its adoption.

Best Regards,

John & Debra Connolly

Dillon Beach, CA

Winnie Chan
Refuge Planner
Farallon NW R CCP

Dear Ms. Chan:

I believe strongly that the Farallon Islands, and their fragile ecosystems, need protection, and I very much oppose upening up the refuge to the public through guided tours.

I feel a greater human presence could wreak havor with the endangered Stellar's Sea Lion population, and could be problematical for the Common Murre.

As you know, the Farallones are a crucial refuge for marine mammals and birds, many of which are almeady having difficulties with feeding —global warming has affected upwelling— and breeding. Please vote "no" on opening up the xixx island to more human traffic: the wildlife is so sensitive that groups of people touring the island could have a deleterious effect.

Sincerely, / / ) Ellery Akers P.O. Box 1267

Point Reyes Station, Ca. 94956

41.1

41.2

- 41.1 Comment acknowledged.
- 41.2 Comment acknowledged.
- 41.3 The final CCP addresses ecological challenges such as climate change and foraging ecology impacts to Refuge wildlife.

"Josh Churchman" 03/10/2009 05:15 PM

To: <sfbaynwrc@fws.gov>

cc:

Subject: invasive species

I took a ride out to the Farallone Islands last week and was stunned. I have been fishing around those islands for thirty years and the "improvements" are really mounting up. Everywhere I looked I could see human presence. If I, as a fisherman, have to stay 1500feet away from those rocks to not flush a bird, how do you justify landing a helicopter at any time…ever?

I just spent a year working with the MLPA process and designating a large portion of these islands as no take and no go zones. The joke is on me I guess. The idea that tourists should visit, and would not be "invasive" is absurd.

42.1 Comment acknowledged. Refer to response at 1.2.

3-17-09 Dear Winnie, 43.1 please do not open up The Farallows to your ists. Support after notive B. 11 Those creatures who live there would freak out with on influx of townists Gail Greenleen

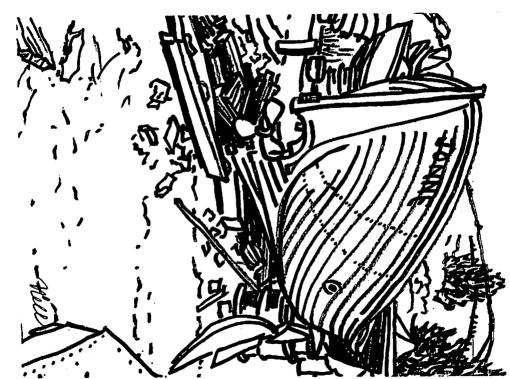
Ms. Gail A. Greenlees
PO Box 567
Point Reyes Station, CA 94956-0567
17 MAR 2009 PM 11

Winnie Chan Son Francisco Bay NWR 9500 Mornton Ave. Newark, CA 94560



Halandadadhallandandhallandhadhadhadhad

Melcher POINTRey & CAT 94956 STATE 17 MAR 20019 PHA 1 T 44.1 Please do not open up the the Farallow's WinnieChan SF Bay NW R tourists! Complex 9500 Support Alternative B Thornton Ave, Thankyou, NewarkCA Mell Muldun 



١.

#### WEST MARIN MEDICAL CENTER

MICHAEL C. WHITT, M.D. EILEEN GLEBER, M.D.

P.O. BOX 240 PT REYES STATION, CA 94956

> TEL. 415 · 663·1082 FAX 415 · 663·9474

3-16.09

Winnie Chan

San Francisco Bay AWR Congley 9500 Thornton Ave

Nevarl, GA 94560

Dear Ms. Chan,

I want to register my Strong opposition do opening the Tarablon I slands to ecctourism. I spent quile a but of time on the islands in the 1970s and know how flogile the caland ecology is, respecially the burrows where Seaburds mest. Disturbance of muree and armoraid atomes lands to gull dependation.

I wrote a both about my experience there: to both of 'hu Farallone.

Regardfully,

Susan Hopp

3/20/2009 01:24 PM

To: sfbaynwrc@fws.gov

cc:

Subject: Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan,

I am writing to endorse Alternative B and oppose plans to open the Farallons National Wildlife Refuge to public visitation as proposed in the Preferred Alternative C.

The Farallon Islands are so very important to wildlife, whether the 400 species of birds that nest on the island or the many mammals whose lives are sustatined by the food chain around the islands.

I ahve visited the Farallons with the Ocean COnservancy and Save the Bay by boat and I know one can have an extremely rich experience without having to venture onto the islands.

In this day of the ravages of human impact to the natural world, we cannot afford nor is it necessary to expand visitor use on the Farallons. Rather we should bring the Farallons to as natural a state as possible.

With regards to the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan, I urge adoption of Alternative B. Alternative B is the best choice because it places emphasis on improved natural resource management, expanded scientific study and improving educations opportunities for the public in a way that maintains the existing priority on protecting wildlife populations and their habitat.

In particular I support Alternative B's focus on:

- 1. Implementing a native plant restoration plan.
- 2. Removing and/or rehabilitating excessive human infrastructure to improve bird nesting capacity and success.
- 3. Encouraging expanded scientific study to enhance the protection, and management of native Farallon wildlife populations and their habitat, including the effect of climate change on these species.
- 4. Expanded off-island education and outreach to improve the offshore visitor experience, including the creation of educational materials and interpretive displays, program outreach to partner visitor centers and the installation of a web camera for people to view wildlife in their native habitat.

Thank you for your consideration, Susan Hopp 15 Castle Rock Drive Mill Valley, CA 94941 415-602-9830

46.3

- Refer to response at 1.2. Comment acknowledged. Refer to response at 1.2. 46.1 46.2
- 46.3

## GEORGE H CLYDE JR

80 Alamo Avenue Berkeley, CA 94708 (510) 526-4974 Phone/Fax gclyde@well.com

March 27, 2009

United States Fish and Wildlife Service c/o Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Submitted by email to: <a href="mailto:sfbaynwrc@fws.gov">sfbaynwrc@fws.gov</a>

Re: United States Fish and Wildlife Service

Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

### Ladies/Gentlemen:

47.1

I write in response to the request for comments regarding the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment, as published at 73 Fed. Reg. No. 246 at 78386 (December 22, 2008). I submit these comments in opposition to the proposal in Alternative C, the preferred alternative, that "... a visitor service plan would be developed to consider on-site visitor opportunities, such as tours for the public ...."

I am aware that several knowledgeable environmental, conservation and scientific organizations have already written in opposition to this plan. I write from a simpler perspective.

I am a boater and fisherman who has sailed and fished around and in the immediate vicinity of the Farallon Islands. To anyone who has had those experiences, the notion of establishing a program of public tours on the Farallones is quite surprising, to say the least.

47.2

The well known conditions of the ocean waters and winds in the vicinity – which can change dramatically in a short period of time to become extremely hazardous – and the lack of any landing areas that would be safe for the public, are only the most obvious reasons to reject the proposal. With a naked eye a passing boat can see that the conditions on the Farallones themselves would be dangerous for public visitors, even if they could be safely landed and retrieved. And, how easy would it be to obtain proper medical care for visitors who are injured or who become ill with heat attacks, strokes, seizures, etc. while visiting the islands?

47.3

While there may be a role for a limited number of properly supervised trained volunteers who are assisting with scientific or conservation activities on the Farallones, I would respectfully submit that the proposal for public tours should be filed away in the "Bad Ideas" Archives of the United States Fish and Wildlife Service.

Sincerely yours,

George Clyde

- 47.1 Comment acknowledged.
- We recognize that visitor services would involve safety and liability considerations. Refer to response at 1.2.
- 47.3 The final CCP includes improved public outreach for volunteer opportunities.



# The Blueoceana Company, Inc.

Legislative, Regulatory & Fact Advocates

Ronald L Signorino President

#### **April 6, 2009**

Ms. Winnie Chang Refuge Planner Farralon NWR CCP San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Re: Draft Farallon CCP/EA Docket FWS-Rs-2008-N0282; 81640-1265-000-S3

Dear Ms. Chang:

Consistent with Fish & Wildlife Service's (FWS) **FEDERAL REGISTER** notice of late December 2008, wherein the agency has put forward several options (alternatives) that speak to the ultimate near term disposition of the Farallon National Wildlife Refuge (FNWR) and in accord with subsequent notices that have effectively extended the comment due date, The Blueoceana Company, Inc. herewith submits its comments into the public record of this proceeding.

After reviewing the draft CCP/EA, and after fully examining the four "alternatives" set out within its some 100+ pages, we must conclude that three reasonable, rational, logical and legally-consistent alternatives having consonance with the executive order that first distinguished this area are present. Moreover, the same three alternatives can reasonably coexist with the relevant protective statutes that have contributed to the enormous historic biological successes at the instant refuge, while one alternative (Alternative "C") cannot. All things considered, we would like our sentiments put into the record as supporting "Alternative B."

48.1

Several years ago, our firm was fortunate enough to enter into a limited contractual arrangement with FWS within which The Blueoceana Company was to perform critical, onsite occupational safety & health-related assessments of agency employee means of

E.O. 1043, signed by Theodore Roosevelt on February 27, 1909 Alternatives A, B & D.

Post Office Box 283 Basking Ridge, New Jersey 07920 Phone: (973) 727 8033 Facsimile: (908) 766 0534 E-mail address: blueoceana@optonline.net On The Web:

http://www.blueoceana.com





April 6, 2009 Page Two

access/egress to the principal island at FNWR<sup>3</sup>. Before undertaking any assignment, our firm is meticulous in its research and study of <u>all</u> relevant aspects of the workplaces we are to attend.

In that analysis, we became completely impressed with the incredible biological achievements realized over almost a century of prudent, reasonable and equitable government husbandry at FNWR. We became accustomed to viewing FNWR as being the percolator for a wide range of wildlife viability. In our due diligence research, we saw that the relatively unmolested presence of this facility served not only local (Bay area) categories of wildlife, but also amazingly diverse species of birds, fish and sea mammals that utilize FNWR as a migratory base, and who ultimately populate many thousands of miles of Pacific coast territory.

Instructively, the technical aspect of our contract with FWS was centered around the ship to shore/shore to ship transfer of FWS employees to/from South East Farallon Island. In truth, as that somewhat complex process punctuates, while the safe transfer of such workers can be ensured to a reasonable level of confidence, the general methodologies used in such access/egress are not the type of passive accommodation members of the public or recreational visitors are accustomed to or expect. Moreover, given the geographic attributes of these islands, there are no simple berthing arrangements present, nor can such arrangements ever be built<sup>4</sup>. Access, as a consequence, will be difficult (at best) and potentially litigious (at worst).

Finally, Given the date of the **FEDRAL REGISTER** notice announcing the availability of the CCP/EA (and the "preferred alternative" expressed therein)<sup>5</sup>, we have very little difficulty envisioning an environmentally backward-thinking executive administration seeking to advance the self-serving preferences of their closer constituencies in such administration's waning days of power.

We sincerely hope that, given the reasonableness, professed belief in responsible environmental stewardship, thriftiness and respect for the law espoused by the Obama administration, we can count on our current government to not open up the FNWR any more than the notice's "Alternative B" provides for. Indeed, "Alternative B", if reasonably

South East Farallon Island. <sup>4</sup> That is, not without disturbing the environmental imperatives now protected by law, and even then only at great fiscal expense. December 22, 2008

Post Office Box 283 Basking Ridge, New Jersey 07920 Phone: (973) 727 8033 Facsimile: (908) 766 0534 E-mail address: blueoceana@optonline.net On The Web:

http://www.blueoceana.com



48.2

40.0



April 6, 2009 Page Three

administered, provides all the latitude necessary for all segments of domestic and international society to fully understand, view and appreciate every inch of this habitat; without risking the biological reverses that would certainly accrue within the blatant excesses of the Bush administration's "preferred alternative."

Thank you for the opportunity to provide our views relative to this extremely important matter.

Sincerely,

Post Office Box 283 Basking Ridge, New Jersey 07920 Phone: (973) 727 8033 Facsimile: (908) 766 0534 E-mail address: blueoceana@optonline.net On The Web: http://www.blueoceana.com



- Comment acknowledged. Comment acknowledged. Refer to response at 1.2. 48.1
- 48.2
- 48.3

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49.1 Please So Not
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NORTH BAY CA 949 17 MAR 2009 PM 3 T



S.F. BAY NWR Complex 9500 Thornton frams Newach, CA,

# MARCH 16, 2009

MS CHAN:

PLEASE DO NOT OPEN THE
FARMION ISLANDS TO THE
PUBLIC - OUR FEW WIND
SOUTH SANCTUAPIES NEED TO BE
PRESERVED FOR THE NATIVE
SPECIES - THANK YOU THE WHITEMER

L. WHITEVER PO BOX 268 CIRTH BAY CA SHE S WORDSCOPE GA 1949 7300 PINE I T



MS. WINNIE LAHAN Z SF BAY NWR COMPLEX 9600 THORNTON AVE NEWARK, CAMFORNIA

94560





3/10/09 51.1 Dear Ms. Chan, Please do not open up the
Please do not open up the
Farrallous to tourists. Support alternative
B! Protect the birds. Thank you. sincerely, Barbara Gaman p.o. Box 276 Inverses, CA98937



Ms. Winnie Chen
SF Bay NWR
Compley 9500 Thornton Ave.
Newark, CA 94560

H.L. J. M. Halland and H. Halland and H. Halland

march 15, 2008 Dear Ms Chan. Please do not open up the Farallons to tourists. Support Alternative B! Trank you, Found

Bonnie Touh Po. Box 1497 Point Reyes Statur, CA 94956 A 949 5 I I MAR STEED PART I L

Winnie Chan S.F Boy NWR. Complex 9500 Thorlaton Ave Newark, CA 94560





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support Alternative B!
Thank you!
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Winnie Chan SF Bay NWR Complex 9500 Thornton Ave Newarkt CA

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### STATE OF CALIFORNIA

## GOVERNOR'S OFFICE of PLANNING AND RESEARCH

## STATE CLEARINGHOUSE AND PLANNING UNIT



CYNTHIA BRYANT DIRECTOR

GOVERNOR

March 20, 2009

Winnie Chan U.S. Fish and Wildlife Service 9500 Thorton Avenue Newark, CA 94560

Subject: Farallon National Wildlife Refuge: Draft Comprehensive Conservation Plan and Environmental

Assesment

SCH#: 2009024004

Dear Winnie Chan:

The State Clearinghouse submitted the above named Environmental Assessment to selected state agencies for review. The review period closed on March 19, 2009, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

54.1

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely, Levy Poisst

Terry Roberts

Director, State Clearinghouse

# Document Details Report State Clearinghouse Data Base

SCH# 2009024004

Project Title Farallon National Wildlife Refuge: Draft Comprehensive Conservation Plan and Environmental

Lead Agency Assesment

U.S. Fish and Wildlife Service

Type EA Environmental Assessment

Description This Comprehensive Conservation Plan will guide management of the Farallon National Wildlife

Refuge for the next 15 years. Established vision for the Refuge and sets goals and management

Fax

objectives and identifies strategies for achieving refuge purposes.

**Lead Agency Contact** 

Name Winnie Chan

Agency U.S. Fish and Wildlife Service

Phone (510) 792-0222

email

Address 9500 Thorton Avenue

City Newark State CA Zip 94560

**Project Location** 

County San Francisco

City San Francisco

Region

Lat/Long

Cross Streets 25 miles west of San Francisco, CA (offshore)

Parcel No.

Township Range Section Base

**Proximity to:** 

Highways

Airports

Railways

Waterways Pacific Ocean

Schools

Land Use Wildlife Refuge

Project Issues Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Cumulative Effects;

Recreation/Parks; Toxic/Hazardous; Vegetation; Water Quality; Water Supply

Reviewing Agencies Resources Agency; California Coastal Commission; Department of Conservation; Department of Fish and Game, Region 3; Office of Historic Preservation; Department of Parks and Recreation; San

Francisco Bay Conservation and Development Commission; Department of Water Resources; California Highway Patrol; Caltrans, District 4; Regional Water Quality Control Board, Region 2; Department of Toxic Substances Control; Native American Heritage Commission; State Lands

Commission

Date Received 02/17/2009

Start of Review 02/17/2009

End of Review 03/19/2009

Note: Blanks in data fields result from insufficient information provided by lead agency.

54.1 Letter acknowledged.

2/28/09 Dear Ms. Chan, 155.1 Please do not allow Public access to Farallow Island W. WR. There is no need for. this and it would be highly destructive to such / a proubie wildlife refuge Thank you, Linda Miceletto

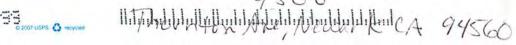


Linda S. Nicoletto 21 Hickory Ave. Corte Madera, CA 94925-1026 DE FEB 2000 - PH



Winnie Chan Refuge Planner SFBay NWWR Comply 9500





Winnie Chan -SIN Francisco Boy NWR Complex 9500 Thornton Ave. Newark, CA 94560

Ms. Chan.

Tweeten signit of Alternative B

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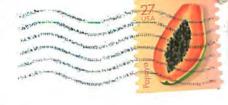
Alternative Circulat allow. The

Mr. Edward Mainland 1017 Bel Marin Keys Blvd. Novato, CA 94949



Mr Edward A Mainland 1017 Bel Marin Keys Blvd Novato, CA 94949

25 MAR 2000 PM 3 L

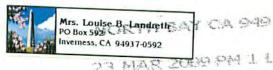


Ms. Winnic Clish Consbod Covers Notional Hard, NM SF Bay NWR Complex 9500 Thoriston Ave. Newark, CA 94560

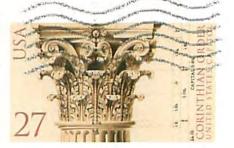
March 23, 2009 Dear Winnie 
57.1

Please don't open up the Farallones to tourists. Support Alternative B!

Thank you. Louise Landreth



23 MAR 2000 PM 1 1



Winnie Chan SF Bay NWR Complex 9500 Thornton Ave. Newark CA 94560



57.1 Refer to response at 1.2.

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The Terrace Mount St. Mary's University

Unnie Chan S. J. Bay NWR Complex 9500 Thornton and Newark, CA Holodoldollollondlondlollondlon Prestation







Nancy Sakellar P.O. Box 610 Pt. Reyes Sta., CA 94956-0610 3-16.09

Dear Ma Chan. Please do not open 1 up she Farrallones to tourists. Allowing tourists tours would be mast destructive. Sincerely. Tinerely Sakelar 58.1 Refer to response at 1.2.

3-16-09 Dear McChan -59.1 Please do what you can to keep the Farallone Islands From being opened up fartourists and the general public. The wildlife reads the seclusianto not Frightand to not live in the pollution we seem to always bring wherever wego, Please support Alternative B -Cathban Don sa Box 267 Pt Dayes CA94956

NORTH CANCES OF A LOCAL CONTRACTOR OF A LOCA

LOINTE Chan SFBay NWR Complex 9500 Thanton Ave Newark, CA 94560





59.1 Refer to response at 1.2.



March 13, 2009

Ms. Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560 765 University Avenue Sacramento, CA 95825 Tel: 916-649-7600 Fax: 916-649-7667 www.ca.audubon.org

RE: Comments on the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP)

Dear Ms. Chan,

We are writing on behalf of Audubon California's approximately 50,000 members to comment on the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). The mission of Audubon California, a field program of the National Audubon Society, is to protect birds and their habitats, and to connect people with nature. We coordinate closely with our chapters, many of which are based in the San Francisco Bay Area and whose members are longtime supporters, volunteers and users of the San Francisco Bay National Wildlife Refuge Complex.

We applaud the Service on a draft management plan that is clearly written, highly detailed, and, with one exception, an excellent blueprint for the next 15 years. Almost all of the objectives under Goals 1-4 are necessary and appropriate for optimal long-term management of the Refuge.

In particular, we urge the Service to fully fund research and management actions to protect and restore the Ashy Storm-Petrel, one of the world's rarest, most range-restricted seabirds. The global population of Ashy Storm-Petrel is less than 6,000 individuals, with half of the population breeding on the Farallon Islands and the other half in the Channel Islands. The species appears to be in decline due to a combination of threats including predation by native and non-native predators (exacerbated by human disturbance), light pollution, habitat modification (nest trampling), and climate change. The Service is now considering listing the bird as a threatened or endangered species. Two federal agencies – the Service and the Park Service - are truly the stewards of this species nearly restricted to California. As such, the specific expenditures to better understand and protect Ashy Storm-Petrel on the Farallon Islands are well-justified.

We also urge the Service to fund the positions of "Wildlife Refuge Specialist-full time" and "Environmental Education Specialist- half-time." As described in the CCP, "changing (the Specialist) position to permanent status is necessary to provide continuous management of Refuge activities and objectives as identified in the CCP. An Environmental Education Specialist is needed to develop and implement school programs, outreach to pilots and boaters, and other outreach programs. A total of \$101,000 per year is needed to fund the 1.5 additional staff positions."

60.2

60.1

We are highlighting the urgency of funding these positions because continuity of key positions would greatly improve the effectiveness of key resource stewardship and monitoring objectives of Goals 1-4. Funding these positions would also leverage the many partnerships the Refuge has with regional NGO's and businesses, including PRBO Conservation Science which has been co-managing the Refuge since 1968, as well as the handful of concessionaires that run wildlife boat trips out of San Francisco Bay.

Our only concern with the CCP is Objective 3.3, "evaluate a range of on-site activities for the public including group media tours, guided walks, and docent training ...and implement if safe and compatible." The rationale for this Objective is the 1997 Improvement Act which identifies wildlife-dependent recreation as a priority use for refuges when it is compatible with refuge purposes.

We sympathize with the Service's desire to increase public exposure and knowledge of the refuge - which is remote and poorly known outside of naturalist circles - because such exposure to nature tends to build support for conservation goals and instills a conservation ethic in the next generation. However, there are two compelling counterpoints to this argument.

60.3

First, we concur with PRBO Conservation Science that opening the Refuge to public tours and recreation would threaten wildlife with excessive disturbance. Biologists from the SF Bay NWR Complex and PRBO have documented the extreme sensitivity of murres, cormorants, pelicans, and other seabirds that have evolved in the absence of predators on breeding islands, as well as the five species of marine mammals that use the islands to haul-out without fear of human disturbance as on the mainland. In addition to direct disturbance, on-site visitors could increase the chances of introducing non-native plants and animals and trampling burrows of cavity-nesting seabirds.

60.4

Second, the public already has good access to most of the Refuge's abundant and diverse seabird and marine mammal via boat trips run by local for-profit and non-profit concessionaires. A thirty-second Google search for "Farallon Island trips" shows three concessionaires operating out of San Francisco Bay. These boat trips have been running for many years and serve between 30,000-50,000 people per year. The boats are allowed to get as close as 300 feet of the Refuge, weather permitting, a distance which allows the public, even those without binoculars, clear views of dense colonies of murres and cormorants. We question whether the additional benefits of landing on-island would out-weigh the significant risks, to both wildlife and people.

60.5

For those who can't afford or don't want to go on a boat, the abovementioned Outreach Coordinator position would help distribute Farallon Island videos, island-cam footage and other media to schools and museums, and develop other outreach programs.

60.6

Finally, the Bay Area is blessed with an abundance of open space and areas specifically geared toward increasing public access to marine wildlife. A few examples include Richardson Bay Audubon Preserve, the Hayward Shoreline, Martin Luther King Jr. Shoreline, beaches and cliffs of GGNRA, etc. In the context of these opportunities, it seems less urgent to open public access to the Farallon Islands, the site of the largest number of breeding seabirds at a single colony in the Lower 48.

Thank you for the opportunity to comment on the draft plan, and please call us with any questions. We are grateful for the continued high-caliber work of USFWS in its role as steward of the Farallon National Wildlife Refuge, and we look forward to providing support and outreach through our state office and local chapters.

Sincerely.

Anna Weinstein

Seabird Conservation Coordinator

Gary Langham

Director of Bird Conservation

- 60.1 We concur. Funding for ashy storm-petrel monitoring and research is a priority in the CCP.
- 60.2 We concur and will work to find these positions permanently.
- 60.3 Any type of public access would be assessed for its impacts to wildlife. Refer to response at 1.2.
- 60.4 We agree that charter boats provide good access. In the CCP, we plan to work with companies to enhance their programs. Refer to response at 31.5.
- 60.5 We agree. The CCP includes objectives that will enhance outreach off-site.
- 60.6 Comment acknowledged. We agree that there are several opportunities to experience marine wildlife in the bay area.

## MARY JANE SCHRAMM 106 EDISON STREET CORTE MADERA CA 94925

April 7, 2009

Fax 510/745-9285

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

> Re: Endorsement Alternative B, and opposition to public access as listed in Preferred Alternative C.

Dear Ms. Chan,

I am writing to comment on the Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment (CCP).

Specifically, Alternative C of the FNWR Draft Plan contains language that proposes assessment of on-island recreation, including guided public tours. However, opening the refuge to public tours and recreation could jeopardize one of our country's most sensitive natural resources.

61.1

Wildlife disturbance and impacts on wild habitats through on-site visitation would likely present an unacceptable level of damage to a fragile ecosystem. Infrastructure changes necessitated for safe public visits would be costly and destroy much of the wild nature of this place.

For over a quarter century, with The Marine Mammal Center, the Oceanic Society, and with the Gulf of the Farallones National Marine Sanctuary I have been directly involved in marine conservation through media and public outreach, and scientific research. I have been fortunate to have worked several times on SE Farallon through PRBO internship and assisting the Farallones National Marine Sanctuary with intertidal surveys. Through these experiences I have gained an appreciation of the fragility of the islands and surrounding ecosystem throughout various seasons of the year.

At this critical juncture, we are just beginning to realize the enormous human impacts we have had and are still having on natural systems. Many of these actions have resulted in an 61.2 unstoppable momentum, precipitating further declines in ecosystem health. Therefore, I advocate for exercising the Precautionary Principle to the fullest extent possible in the Refuge's management plans.

I applaud the Refuge's involvement of the public as visiting interns, in wildlife studies and restoration/eradication projects, but casual visitation is not appropriate in a situation like this. If someone wishes the privilege of an island visit, they should be prepared to contribute in the currency of "sweat equity. "The Refuge is not an animal park; it is a unique site for stewardship and research on wild populations, of significant importance to the entire California Current Ecosystem.

61.3

Education leading to public awareness and stewardship is key to conservation, but the means by which the Refuge accomplishes this must not damage or destroy the very things we seek to protect. Programs and techniques not involving public site visits, such as videos, web cameras, etc. can greatly enhance the refuge's outreach efforts.

Thank you for your attention.

Sincerely

Mary Jane Schramm 41/5 561-6622 x205

Cc: Mendel Stewart, Gerry McChesney, US Fish and Wildlife Service PRBO Conservation Science

- 61.1 Comment acknowledged. Refer to response at 1.2.
- 61.2 Comment acknowledged.
- 61.3 The final CCP includes using methods such as a remote camera system to connect people to the Refuge without stepping foot on the Refuge.

Winnie Chan San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

Re. Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms Chan,

Please accept a few comments, regarding the above plan, from one who is extremely alarmed about a proposal to allow expanded public tours and visitors onto Farallon Islands. This sounds like something that would come out of a Bush Administration. It ranks right up there with the proposal to carry concealed loaded weapons within national parks!

As a retired educator. I look upon my own profession as having somewhat failed in the role of educating students about the natural world and the ecology of plant and animal communities, and then having them grow up and some of them proposing such disruptive activities on such a unique habitat as the Farallon Islands.

What would Darwin say if he were here to read the proposal? probably "Unbelievable".

My wife and I live close to boundaries of The Point Reyes National Seashore Park. We have been involved since the park was established to maintain its integrity, especially the designated wilderness areas. I recall one early meeting when a Marin citizen spoke up for a road through the wilderness so that he could drive his 80 year old mother through the area to sight see. I don't think anyone has a right-either God given or otherwise- to trespass with increasing numbers of other humans on sensitive areas as the Farallons.

Do the right thing, ecologically speaking, and support measures to enhance-not degrade- the quality of life for the native inhabitants on and around the Farallon Islands.

Sincerely,

Russell Hlage

Russell Widge

Retired Biology Professor, College of Marin

- Comment acknowledged. Refer to response at 1.2. 62.1 62.2





## Department of Toxic Substances Control

Maziar Movassaghi, Acting Director 700 Heinz Avenue Berkeley, California 94710-2721



March 24, 2009

Ms Winnie Chan, Refuge Planner Farallon National Wildlife Refuge San Francisco Bay National Wildlife Refuge Complex 9500 Thornton Avenue Newark, California 94560

COMMENTS ON THE FARALLON NATIONAL WILDLIFE REFUGE DRAFT COMPREHENSIVE CONSERVATION PLAND AND ENVIRONMENTAL ASSESSMENT (CCP/EA), NOVEMBER 2008

Dear Ms. Chan:

Thank you for the opportunity to review the subject CCP/EA. The Department of Toxic Substances Control (DTSC) regulates management of hazardous wastes and cleanup of hazardous substance release sites in California. However, our comments are not intended to assert an active regulatory role at the Refuge at this time. Rather these comments reflect our desire to share insights we have developed in the course of our work at other sites with some similar features. Our comments are presented below. We have referenced our comments to three specific objectives of the CCP, but intend that the comments be considered wherever they apply in the CCP or the EA.

COMMENT 1. CCP Objective 1.3 (Page 85) suggests that the Fish and Wildlife Service (FWS) will "support regional efforts to prevent and/or contain oil spills and other contaminants near the (Farallon National Wildlife) Refuge's islands to protect seabird and other wildlife." We believe that this objective must explicitly address potential impacts to the refuge from the disposal of drummed hazardous and radioactive waste near the Islands and within the Gulf of Farallons National Marine Sanctuary. The possibility that some drummed wastes may have been disposed in shallow water to the east of the islands is of particular interest, as degradation of containers and current transport of coherent drummed waste is a distinct possibility. Inclusion of these wastes in regional efforts is of course necessary to evaluate and remedy impacts to wildlife in the Refuge.

63.1

Additionally, we respectfully suggest that the qualitative determination that the historic oil and diesel releases on the island be backed up with data collected over time that

Ms. Winnie Chan March 24, 2009 Page 2

demonstrates a reliable and continuing reduction of petroleum hydrocarbon concentrations.

COMMENT 2. CCP Objective 2.1 (Page 89) suggests that habitat will be enhanced by "removing or reusing all unutilized artificial structures and replacing them with habitat for native vegetation and wildlife." We respectfully suggest that your structure replacement plans include an evaluation of lead in soils associated with paint on these structures. The presence of some terrestrial birds and likely occasional predation by peregrine falcons on the islands presents a pathway for ecological exposure to the falcons. We note that allowable lead concentrations in soil at the Presidio of San Francisco are limited by the relationship between terrestrial birds feeding on terrestrial invertebrates and their subsequent predation by peregrine falcons, and suggest a similar approach at the Islands. Our advice extends to locations where artificial structures that may have been painted have already been removed.

COMMENT 3. CCP Objective 4.1 (Page 94) suggests that the FWS will conduct a survey and implement a plan to protect cultural resources on the Refuge. As with our Comment 2, we suggest that you include in your cultural resources inventory and protection initiatives an evaluation of lead in soil around structures.

Again, thank you for the opportunity to comment on the CCP/EA. If you have any questions, please contact me at (510) 540-3772.

Sincerely,

63.2

Daniel Murphy, P.E.

Unit Chief

Brownfields & Environmental Restoration Program

- 63.1 The final CCP includes an assessment and plan of action for the drummed hazardous and radioactive waste near the Refuge and within the Gulf of Farallones National Marine Sanctuary. The Service will work with other stakeholders to develop needs and protocols for dealing with this waste. The Service will also continue to assess oil and diesel contaminants that may surface on the Refuge in order to reduce concentrations.
- 63.2 The final CCP includes an assessment of lead contamination in excess materials and soils.



UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NATIONAL OCEAN SERVICE

Guif of the Faraliones National Marine Sanctuary 991 Marine Dr., The Presidio San Francisco, CA 94129

March 31, 2009

Sent Via Email and Facsimile

Winnie Chan, Refuge Planner San Francisco Bay NWR Complex 9500 Thornton Avenue Newark, CA 94560

RE: Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan

Dear Ms. Chan:

Gulf of the Farallones National Marine Sanctuary (GFNMS) has reviewed the U.S. Fish and Wildlife Service Farallon National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment (CCP), dated November 2008. GFNMS manages the waters and submerged lands surrounding the Farallon Islands to the mean high water. GFNMS has been and will continue to be an active stakeholder in implementation of the CCP. Many of the GFNMS interpretation, education, research, enforcement and management programs rely on the strong partnership between the U.S. Fish and Wildlife Service and GFNMS. GFNMS staff are committed to continue to build upon and strengthen this partnership during the implementation of the CCP.

All comments provided herein discuss GFNMS' review and analysis of the CCP and the alternatives for implementation, focus on the opportunities for coordination between the U.S. Fish and Wildlife Service (Service) and GFNMS, and examine the need for clarification of GFNMS programs and regulations throughout the CCP.

#### I. GENERAL COMMENTS

Comprehensive Conservation Plan

GFNMS supports the vision statement and the purposes of the CCP as listed on page 1. The provided background information regarding the Service and the National Wildlife Refuge System is comprehensive and gives thorough guidance on the conservation and management of the Refuge ecosystem, and has helped us in our analysis of the management objectives listed in Chapter 5 and the proposed alternatives in Appendix D

Chapter 5 and the proposed alternatives in Appendix D.

GFNMS commends the Service for doing an excellent job at identifying opportunities for potential partnerships and collaborations with GFNMS programs. GFNMS staff welcome these opportunities, and we have provided additional information in this letter to help us strengthen existing partnerships and develop new project collaborations. Specifically, the GFNMS education and climate change programs have several opportunities for partnerships, which have been suggested throughout this letter.

We have several suggestions to clarify and strengthen the strategies listed in Chapter 5 and the associated planning process, and to enhance the introduction and the section on the refuge and

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resource description. These suggestions can be found in our comments below beginning on page five of this letter under: Section II - Edits, Additions and Deletions.

#### Environmental Assessment

The Environmental Assessment (EA) has identified Alternative C as the preferred alternative. GFNMS recognizes that Alternative C is consistent with the five National Wildlife Refuge System goals, and implementation of Alternative C will result in positive benefits to wildlife conservation since resource management will be extended, the current wilderness area would be preserved, and there will be increased public education regarding the sensitive wildlife and important function of the Farallon Islands ecosystem. We also understand that the Refuge Improvement Act recognizes wildlife-dependent recreational uses, when determined to be compatible with the mission of the System and purposes of the Refuge, and that Alternative C will evaluate potential on-site recreation opportunities. If Alternative C is selected, then we request an opportunity to review the compatibility determination for this proposed use of the Refuge, and we would like to partner with the Service on the development of the Visitor Services Plan to ensure that visitor activities will be compatible with, and not increase impacts to the wildlife resources that we share.

Although Alternative C is consistent with the National Wildlife Refuge System goals, GFNMS believes that Alternative B - expand resource management, and increase public education and outreach -- will more fully meet the vision statement, National Wildlife Refuge System mission and goals, refuge purposes, related projects, and conservation priorities as outlined in chapter one of the CCP. Alternative B takes a more precautionary, risk-adverse approach to protecting Refuge wildlife; is consistent with the National Marine Sanctuaries Act (NMSA), GFNMS Management Plan and associated regulations; would have the greatest positive impact on our shared wildlife resources; is consistent with other federal and state projects; and will buffer against impacts from climate change.

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First, it is clear from the CCP that the conservation, management, and restoration of fish, wildlife, and plants and their habitats take precedent over other purposes in the management and administration of a refuge (CCP, page 14), and that the primary conservation priority for the Refuge is restoring the historical abundance of seabirds and marine mammals through natural processes (CCP, page 17). Alternative B includes actions that will help restore these populations and keeps on-site uses restricted to the current level for the purposes of management, monitoring, or education and outreach as analyzed in the compatibility determinations in Appendices J-L.

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According to the CCP, alternative C was selected as the proposed action because it was determined by the Service to best achieve the Refuge goals and purposes and is founded upon the need for restoring habitat, protecting wildlife, and focusing research and monitoring programs on priority needs. The alternative also integrates environmental education, outreach, and wildlifedependent recreation objectives that will connect the public to the Refuge. However, there are alternative approaches to allowing wildlife-dependent recreation, which do not rely on on-site visits, can reach much broader audiences and wider range of the public, and promote the conservation of wildlife. These opportunities can be created through offshore ecotourism, telepresence at Bay Area visitor centers and aquariums, and real-time interactive telepresence programs that link the public directly to the Refuge. The Office of National Marine Sanctuaries has extensive experience creating and implementing these programs, and GFNMS staff welcome opportunities for collaborations.

Currently Alternative C does not include a compatibility determination for on-site public opportunities, so we are unable to comment on any specific impacts that could result from selecting this Alternative. However, according to the cumulative impacts analysis in the EA, the introduction of any on-site public opportunities, as proposed in Alternative C, may result in damaging wildlife habitat, which could impact roosting, breeding and nesting wildlife; whereas Alternative B takes a more precautionary approach to managing the wildlife resources of all the Farallon Islands. If additional education and outreach strategies are added to the CCP, it is possible that Alternative C may not need to rely upon on-site visitation as the primary way to connecting the public to the Refuge, which can result in avoiding negative impacts to wildlife and their habitats.

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Second, Alternative B is consistent with the National Marine Sanctuaries Act, GFNMS Management Plan and regulations. GFNMS was designated pursuant to the NMSA, the purposes and policies of which include maintaining the natural biological communities, and protecting and where appropriate, restoring and enhancing natural habitats, populations, and ecological processes (16 U.S.C. §1431 et seq.).

Through regulation, GFNMS prohibits certain activities that are inconsistent with the goals, objectives, mandates and policies of the National Marine Sanctuaries Act and the Management Plan. Currently, GFNMS has regulations that protect our shared wildlife resources when they are above or in the waters surrounding the Farallon Islands. The first regulation prohibits "taking" any marine mammal, sea turtle or bird in or above the Sanctuary. Taking includes harassing or doing any other act that results in the disturbance of any marine mammal, sea turtle or seabird (15 CFR §922.3). The only exceptions to this regulation are through permitting for research or education, as authorized under the MMPA, ESA, and MBTA. Additionally, GFNMS has a regulation that prohibits disturbing seabirds or marine mammals by flying motorized aircraft at less than 1000 feet over the waters of the Farallon Islands. The enforcement of these regulations results in protecting seabirds and marine mammals that reside on the Farallon Islands and forage in or migrate through GFNMS. Many of these species are below historic populations. GFNMS supports providing additional protections from anthropogenic disturbance while these species are on the Farallon Islands. Since Alternative B does not include an option for evaluating on-site visitor opportunities, it protects wildlife from potential additional sources of disturbance and increases the opportunity for the restoration of these species.

The GFNMS management plan, which was adopted in October 2008, includes an issue-based action plan to protect wildlife from human-caused disturbances. The wildlife disturbance action plan has the following strategies for preventing wildlife disturbances that is consistent with Alternative B, including:

- Coordinate with other agencies, institutions and programs to better understand and address anthropogenic noise, light and visual impacts on wildlife from vessels and low flying aircraft.
- Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife.
- Maximize media venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues.
- Coordinate the Seabird Protection Network aimed at improving the survival and recruitment of seabird colonies by reducing and eliminating human disturbances at

seabird breeding and roosting sites from Point Reyes to Point Sur, including the Farallon Islands.

Third, Alternative B is most consistent with the state-sponsored North-Central Coast Marine Life Protection Act Initiative preferred alternative for protecting nesting and roosting seabirds and breeding and hauled-out marine mammals. Over the past year we have been working cooperatively with other stakeholders on protecting the most critical seabird and Steller sea lion breeding areas as part of the Marine Life Protection Act Initiative. As a result of these efforts, the California Fish and Game Commission has created a preferred alternative that would protect the Southeast and North Farallon islands from close-approaching vessels through the adoption of Special Closures, areas where vessels are prohibited from entering.

GFNMS supports Special Closures at the Farallon Islands in order to aid breeding success, increase populations, and help seabirds recover from oil spills. Special Closure concerns have focused on ecotourism access and navigation/safety. The preferred alternative is a compromise proposal that addresses ecotourism and navigation/safety concerns both seasonally and year-round at Southeast Farallon Island by leaving two areas open year-round all the way to the shoreline: Fisherman's Bay and East Landing, specifically to allow for wildlife-dependent recreation. An additional area is open for seasonal shark tourism, and balances conservation needs by maintaining existing speed and noise restrictions. Alternative C has the potential to cause disturbance-related stresses to these scabird and marine mammal populations, which would otherwise be fully eliminated through offshore sources if the preferred alternative for Special Closures is adopted. Alternative B still allows for and encourages vessel-related ecotourism near the islands, but prevents these activities on shore, which provides more protections to these wildlife populations.

Finally, Alternative B is the best alternative for buffering against wildlife and habitat impacts from climate change. The CCP needs to fully consider the cumulative effects of human-induced and environmental impacts to Farallon Island habitat and species, especially regarding increased cumulative effects already impacting island populations due to climate change. According to the CCP, cumulative effects are those effects on the environment resulting from incremental consequences of the Service's proposed actions when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes those actions. It is important that the Service considers its actions as related to the other current, human-induced threats such as climate change, and adequately characterizes these in the cumulative effects section of the EA.

As oceanic variability will increase due to climate change, short-term phenomena that already affect the island's populations such as extreme weather events (e.g. heavy storm surge and heat waves) and changes in upwelling patterns (affecting food availability and the timing of lifecycle events) can become more pronounced and occur with more frequency. Although the CCP does briefly consider some of the potential impacts from climate change to the Farallon Islands, it needs to further consider the cumulative impacts of short-term phenomena, which can become more pronounced and occur with more frequency, as well as the likelyhood of these short-term anomalies transitioning into long-term trends within the duration of the CCP implementation. To highlight potential cumulative effects, in 2005 and 2006, unprecedented breeding failure for the island's Cassin's Auklet population occurred due to weak and delayed upwelling that resulted in a decline in prey availability. In May 2008, the Farallon Islands hit record air temperatures of 90 degrees. The Cassin's Auklets that had resumed nesting in provided bird boxes in 2007 and 2008

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now suffered heat stroke. Additionally, the wildlife populations of the Farallon Islands currently face the ongoing, human-induced threats of oil spills, introduced species, disturbance, and fishing impacts. The EA does not consider the effects of oil spills, nor does it consider the impacts island populations may face due to the sum of these threats.

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Alternative C can result in increased human access to these populations, an additional threat with the potential of causing increased stress on certain species that may, in turn, suffer a tipping point, no longer able to withstand the stress of cumulative human and environmental impacts. GFNMS strongly urges the Service to consider the impacts of these additional, more imminent threats to wildlife as a result of climate change and other human-induced stresses before adopting an option that would potentially increase visitation to the Farallon Islands. We believe that Alternative B is the most appropriate approach to management in light of the issue of climate change.

#### II. EDITS, ADDITIONS AND DELETIONS

The text below provides comments on recommended changes to the CCP and EA, as proposed by GFNMS, including specific additions and deletions. Strikethrough text is proposed for deletion. Text in [underline brackets] is proposed for addition. These suggests follow the table of contents.

### Chapter 1. Introduction and Background

Ecosystem Context and Related Projects, Page 15 – Change the following:

Gulf of the Farallones National Marine Sanctuary Draft Management Plan

The Refuge is within the Gulf of the Farallones National Marine Sanctuary (GFNMS). The

GFNMS was created to protect the extensive marine resources that this area provides to both

marine organisms and humans. The GFNMS is governed by a management plan addressing
three [program] issue areas: resource protection, [conservation science] research, and
interpretation, [outreach,] and education. The [final] management plan is-currently being
finalized [was released in October 2008] and identifies strategies that will be implemented in
a five -year timeframe.

The Draft Management Plans (DMPs) for the GFNMS contains information about the sanctuary's environment, priority management issues and actions proposed to address them, regulations, staffing and administration, operational and programmatic costs, and performance measures. The DMPs [Plan] addresses important GFNMS programs addressing issues such as public awareness and understanding, conservation science, water quality, emergency response and enforcement, and maritime heritage. The final plans and EIS was released in September 2008, representing a major revision of each site's original management plan and are the [is a] result of several years of study, planning, and extensive public input.

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Research goals for the GFNMS include research beneficial to resource management challenges; baseline studies for GFNMS populations and habitats; [modeling, trend analyses and predictive studies], and monitoring studies...

- Ecosystem Context and Related Projects, Page 15 The California Coastal National Monument has issued a final EIS/EIR on the Proposed Resource Management Plan, which was approved in 2005.
- Ecosystem Context and Related Projects, Page 16 Change/add the following to better represent the current process and likely timeline:

#### Marine Life Protection Act

California is currently in the process of implementing the Marine Life Protection Act in the central coast of California. Over the next few years, sState agencies and other stakeholders will be [have been] working to designate Marine Protected Areas in central California, including [the waters of] the Gulf of the Farallones. Actions to limit activities to protect the Gulf of the Farallones could have beneficial effects for the Refuge because wildlife there relies heavily on the Gulf for foraging.

• Threats and Opportunities, Page 16 – General Comment—It seems that this section is primarily focused on threats to seabirds, but does not include disturbance, which is listed as a "concern" in the Management Concerns section in Chapter 2, on page 22. It might be a better fit to put this section in the Management Concerns section in Chapter 2 or at least have consistency between these two sections. If the "Threats and Opportunities" section stays in its current location, we suggest including climate change as a threat.

## Chapter 2. The Comprehensive Conservation Planning Process

- Management Concerns, Page 22 —General Comment This section should be consistent with Chapter 5, Management Direction strategies and relate to the "Threats and Opportunities" section. There are two examples where this is the case: 1) oil/contaminant spills is listed as a threat and not listed as a management concern, although there are specific strategies to address oil spills; and 2) climate change is listed as a management concern, but is not listed as a threat, and there are no specific strategies to address impacts to wildlife from climate change. We have made suggestions to address this in our comments under Chapter 5.
- Management Concerns, Page 22, Disturbance It is suggested that this be separated into two sections (or two subsections): Human-based disturbance and avian predation. The CCP states that, "Human disturbance from aircraft and boat activities is a greater concern that can cause wildlife to flush," however, it does not state what other disturbances are less of a concern. In addition, the following changes are suggested to the second paragraph to explain the potential impacts from flushing incidents.

#### Disturbance

Human disturbance from aircraft and boat activities is a greater concern that can cause wildlife to flush. [High levels of disturbance, including frequent interruptions of natural behaviors or a single severe event, can impact seabirds and marine mammals in several ways. Seabirds can experience a disruption of nest site prospecting, nest site defense, courtship, feeding of young or resting behaviors; nest, egg or chick loss or abandonment;

abandonment. Marine mammals can experience a disruption feeding of young or resting behaviors; increased predation; increased stress levels; higher energy costs; and can cause death from trampling. This can lead to large reductions in the number of breeding attempts and breeding success, causing fewer young to be produced. A reduction in the number of young produced ultimately results in lower recruitment of new breeders needed to maintain or increase populations.] During an average year, island staff document roughly ten boats violating the seasonal boat closure, which prohibits coming within 300 feet of the shoreline during the nesting season. Several aircraft usually fly low enough over the islands every year to potentially cause wildlife disturbance.

• Management Concerns, Page 23 – The following changes are suggested to: 1) clarify the difference between the anticipated and/or likely changes to the wildlife and habitat of the Farallon Islands over the next 15 years, and the possible long-term consequences, and 2) include a list of impacts that were omitted in this section. We also clarified and further defined what is meant by phonological changes by adding more details.

### Climate Change

Anticipated impacts [over the next 15 years] may include: [extreme weather events (e.g. heavy storm surge and heat waves), changes in ocean chemistry such as ocean acidification, habitat loss due to sea level rise, changes in ocean upwelling patterns (affecting food availability).] species range shifts, species extinctions, phenological changes [such as timing of breeding and migration.] and increases in primary productivity. [In the long-term these effects may result in species extinctions.] This challenge is especially important at the Farallon Refuge[,] which is surrounded by the water. Management planning for the Refuge will need to incorporate climate change impacts into land [and wildlife] management activities.

## Chapter 3. Refuge and Resource Description

- Water Supply and Water Quality, Page 36 We are in the process of releasing a condition report for GFNMS. This report is science-based and peer-reviewed. One of the components that we address is the water quality of GFNMS. According to the Draft Condition Report released in 2008, water quality is good to fair in the offshore and coastal areas. There, we suggest the following edits in the second paragraph:
  - The Refuge is surrounded by the GFNMS. Water quality within the GFNMS is generally good [to fair condition in the offshore and coastal areas of the sanctuary] due to the rural character of the coastline (i.e., there are no major industrial discharges) and exposure of the coastline to the strong currents of the open ocean.
- Biological Resources, Vegetation, Page 37 Because FNWR has intertidal vegetation in addition to terrestrial vegetation, we suggest changing the title of the section to [Terrestrial] Vegetation or adding a new sub-section with this title.

Biological Resources, New Section (or sub-section) – We suggest adding a new section, titled "Intertidal Habitat," in order to cover the species found in the intertidal including marine vegetation and marine organisms/invertebrates. Suggested language is below.

## [Intertidal Habitat]

The rocky intertidal habitat of the South Farallon Islands is unique from mainland intertidal areas due to the geographic location of the islands. The intertidal habitat of the islands is unique in that it is exposed to wave action from all directions and void of anthropogenic influences. Common to most rocky intertidal habitats the shoreline of the Southeast Farallon Islands is not exposed to the effects of human trampling, extraction and tide pooling activities. However, pinnipeds can be a source of trampling at the South Farallon Islands. Overall, the Farallon Islands have a much greater percent cover than the rocky intertidal areas along the mainland. Also, algal rarities and extended northern ranges have been documented at the Farallones.

The rocky intertidal areas on the Farallon Islands are predominated with red-turf and coralline algae. The most common genera at the Farallon Islands include Corallina, crustose corallines, Cryptopleura, Egregia, Endocladia, Gastroclonium, Gelidium, Mastocarpus, Mazzaella, Neorhodomela, petrocelis, Prionitis, Ulva, and invertebrates Anthopleura and Mytilus. The intertidal areas of the islands are highly productive and diverse. Over 200 taxa have been found; 5 are rare and 7 are extended ranges. The mean annual percent cover for algae and sessile macroinvertebrates at the South Farallon Islands ranges from 148-255% due to the layering effect of organisms.]

• Wildlife, New sub-section — Guadalupe fur seal, Arctocephalus townsendi, have been seen on South Farallon, West End (Maintop) Island, Isle of St James and North Farallon. Although they are a rarity, the population is increasing in the Channel Islands and individuals are now seen throughout coastal California. We suggest a brief paragraph acknowledging their presence on the islands.

## Chapter 4. Current Refuge Management and Programs

• Wildlife and Habitat Management, Page 72 – We suggest clarifying the extent of the GFNMS intertidal community monitoring program.

Monitoring of intertidal communities within the GFNMS.

In 1992, the GFNMS biologists began monitoring the density and diversity of intertidal species (invertebrates and algae) at six locations on SEFI. Point and photographic quadrants are visited three times annually ([generally]] February, August, and November). The purpose is to develop a baseline species inventory and assess natural changes over time to determine resource risk and damage assessment in the event of an oil spill or other human induced or natural disaster. [The goals are to: 1) Establish a baseline and long-term dataset of algal and invertebrate species, including species abundance, diversity and distribution on the South Farallon Islands; 2) Characterize the rocky intertidal community at the South Farallon Islands and understand changes resulting from anthropogenic impacts such as oil spills and changes due to climate change; ocean warming, increase periods and duration of storm events, and ocean acidification; and 3) Reveal variations in intertidal communities and individual species

as a result of global climate change on the South Farallon Islands. This project helps address the following management issues:

- 1. Identify resources at risk from vessel groundings and oil pollution by mapping spatial and temporal changes in the density and percent cover of the predominant species in the rocky intertidal community to better characterize areas of higher ecological richness.
- 2. <u>Identify changes due to environmental and human caused impacts by monitoring areas where shorebirds forage on invertebrate species.</u>
- 3. If post-oil spill restoration is needed, and recovery rates needs to be determined, use long-term monitoring data sets to provide baseline and trend information.
- 4. Identify indicators of global climate change on the South Farallon Islands by using long-term monitoring data sets of calcium carbonate building organisms such as mussel.

  barnacles and coralline algae, to reveal variations in intertidal communities and individual species.
- 5. Use Farallon Island data set as an example of pristine (control) rocky intertidal habitat to compare to highly and moderately trampled areas and where extraction is high at mainland rocky intertidal areas.
- 6. Reveal and document changes in ranges of species that react to ocean temperature changes by using Farallon Island data set as a comparison with mainland rocky intertidal areas.]

[New paragraph in same section] In 2004 and 2005, the GFNMS added components to integrate the Farallon monitoring with a large-scale research project called the PISCO Coastal Biodiversity Survey Program. The goals of the PISCO study include assessing long-term influences such as climate change and coastal development on intertidal communities and examining patterns of biogeography.

- Law Enforcement and Resource Protection, Page 75 In addition to management guidelines, there are specific laws and regulations that prevent harassment of marine wildlife at the FNWR. Several GFNMS Regulations apply to the areas surrounding, above and adjacent to the FNWR. Here is the list of the most relevant regulations:
  - GFNMS prohibits "taking" or "possessing" any marine mammal, sea turtle or bird in or above the Sanctuary, except as authorized under the MMPA, ESA, and MBTA. Take or taking means to harass, hunt, capture, kill, collect or injure, or to attempt to engage in any such conduct; or to operate a vessel or aircraft or to do any other act that results in the disturbance or molestation of any marine mammal, sea turtle or seabird. (15 CFR Sections 922.3 and 922.82)
  - GFNMS prohibits disturbing seabirds or marine mammals by flying motorized aircraft at less than 1000 feet over the waters within one nautical mile of the Farallon Islands. (15 CFR Section 922.82)
  - GFNMS prohibits attracting white sharks anywhere in the Sanctuary or approaching within 50 meters of any white shark within a line approximately 2 nm around the Farallon Islands. (15 CFR Section 922.82)

These prohibitions can be cited in this section. In addition, it is important to be clear that any disturbance, even human-caused disturbances that don't cause wildlife to flush are subject to warnings, citations and fines under federal law. These points are clarified below:

Law Enforcement and Resource Protection

There are a number of management guidelines [,and federal and state regulations] for those visiting the area surrounding the Refuge. Harassment of wildlife [on FNWR], including unintentional harassment, is strictly prohibited under 50 CFR Sections 27.34 and 27.51. Any [human-caused] disturbance that causes wildlife to flush can be cited and fined.

Any overflights above the Refuge are encouraged to follow FAA recommendations to fly above 2,000 feet above the [FNWR and] GFNMS. [In addition, GFNMS prohibits disturbing seabirds or marine mammals by flying motorized aircraft at less than 1000 feet over the waters within one nautical mile of the Farallon Islands.] [Furthermore.] Between March 15 and August 15, no helicopter landings are permitted on SEFI (Figure 9). In addition, [Staff who occupy the refuge year-round monitor all] aircraft that flies within 1,000 vertical feet and 0.5 horizontal mile of SFI are monitored closely; identification numbers and wildlife disturbance are documented, and appropriate enforcement action (warning or citation) is taken.

Boating regulations [Individuals who visit the Farallon Islands by boat] must comply with [on the water] California regulations including abiding by the [California] 5 mph speed limit within 1,000 feet of all islands [and]. In addition, there are noise restrictions within 1,000 feet of the shoreline of all the islands. [Federal regulations prohibit attracting white sharks anywhere in the GFNMS or approaching within 50 meters of any white shark within a line approximately 2 nm around the Farallon Islands under 15 CFR Section 922.82. Federal regulations also prohibit operating any vessel engaged in the trade of carrying cargo, including tankers.] Between March 15 and August 15, vessel traffic is prohibited within 300 feet of the shoreline at specified portions of SEFI and the North Farallons (Figure 10). This prohibition includes no boats passing between Saddle Rock and SEFI. [In addition, California is currently considering changing the vessel traffic restriction to: 1) apply to a greater area of both SEFI and the North Farallones; and 2) extend to include the entire year.]

• Visitor Programs, Environmental Education, Page 80 – Change Gulf of the Farallones National Marine Sanctuary on lines 4 and 5 to GFNMS to be consistent with acronym used throughout Chapter 4.

## Chapter 5. Management Direction

- Refuge Management Goals, Objectives and Strategies GFNMS supports the four goals listed on page 83. GFNMS has proposed some additional strategies under several of the objectives. In addition, GFNMS has implementation concerns regarding objective 3.3, which calls for the evaluation of on-site activities for the public. We have offered alternative language for this objective (below).
- Wildlife Management, Objective 1.3, Page 85 Implementing this objective is critical to help buffer against negative impacts to wildlife during an oil/contaminant spill. We have a few suggestions to strengthen the following strategies:
  - o Train staff that work on the Refuge to identify, respond to, and report oil spills. Island staff should attend the spill responder course[s] given by [CDFG] Oil Spill Prevention and Response (OSPR) [Coast Guard, EPA] and NOAA.

- Monitor the occurrence of oiled seabirds on and around the Refuge and report numbers to the CDFG OSPR Network [and/or Incident Command].
- Provide input for Hazardous Materials Response Plans, Area Contingency Plans,
   [Dispersant Use Plans,] and other spill prevention/preparedness activities.
- O Implement strategies developed through the Sanetuary [GFNMS] Vessel Spill [Action] Plan and other plans to reduce oil pollution.
- Wildlife Management, Objective 1.5, Page 87 Add the following to the second strategy from the bottom: Encourage non-intrusive research studies that would help inventory and understand some of the Refuge's lesser known fauna, such as insects, bats, [endangered or threatened pinniped species, intertidal species] and salamanders.
- Wildlife Management, New Objective Climate change is the greatest threat to GFNMS. It has recently become policy at GFNMS to include the effects of climate change in all site environmental documents such as National Environmental Policy Act (NEPA) analysis (environmental analyses and environmental impact statements), management plans, and restoration plans. As a result, GFNMS and its partners are now designing restoration projects with climate change in mind.

The most effective natural resource policy and management actions GFNMS can take to address climate change are reducing stressors to the marine environment and protecting high value habitat. Through the site management plan, GFNMS has identified near-shore water quality, oil spills, invasive species, wildlife disturbance, and fishing impacts as the priority issues to address in the region. These priority issues fit well with FNWR management strategies. The goal is to reduce human-induced stressors on the ecosystem and to build ecosystem resilience to adapt to climate change.

Concurrently, GFNMS is identifying high value habitat in the region to designate for increased protection and support species resilience. High value habitat is defined as habitat that supports either high species diversity or abundance or both. One example of this is the sanctuary's work to instate special closure zones to protect valuable seabird breeding and roosting habitat. This reduces stress from human disturbance to seabird colonies, therefore buying time for seabirds to adapt to changing conditions. FNWR is considered high value habitat.

## Suggested Strategies:

- o Partner with GFNMS to develop a climate change or vulnerability assessment. Through a collaborative effort, bring together experts and local scientists to document observed and predicted physical and biological impacts from climate change, including: drivers of regional change and the resulting environmental change; changes in physical habitat structure; population responses; community/ecosystem responses; and impacts of additional stressors such as disturbance and oil spills.
- o Develop research and monitoring strategies in partnership with GFNMS as part of the Ocean Climate Initiative Action Plan.
- o Partner on a demonstration project to implement inter-agency, natural resource adaptive management strategies to address climate change.
- Compatible Wildlife-Dependent Recreation, Objective 3.1: \ GFNMS fully supports

strategies listed in objective 3.1. We work with the organizations listed in bullet 2, we already have these partnerships established, and we welcome participation from the Service, which can join the partnership of volunteer and docent training. Please note that this objective could be bundled with the GFNMS suggested alternative objective 3.3 (below).

• Compatible Wildlife-Dependent Recreation, Objective 3.2: We have suggested edits to two of the strategies in objective 3.2. The first has to do with dissemination of updated Refuge brochures. We strongly suggest that the Service does not rely on dissemination directly to the public through partner venues due to other partners wanting to promote their own programs. The more important aspect of this strategy is to get the information to docents through training. Publications should be developed for docents and volunteers, not the general public.

GFNMS is very supportive of web-cameras and telepresence. We have a placeholder for telepresence, with space available immediately at the Aquarium of the Bay in San Francisco. There is also a potential to have one at California Academy of Sciences. We strongly suggest that the Refuge utilize these opportunities in collaboration with GFNMS that has existing exhibits at these institutions. We also have some suggestions on interactive telepresence. We have added that information to the GFNMS suggested alternative objective 3.3, which is longer term, but has the potential to reach millions of people.

• Compatible Wildlife-Dependent Recreation, Objective 3.3 – We have a standing program several times a year. The national program has the infrastructure and connections to carry out such a program. It can be targeted to school groups and the general public. Getting a much wider audience than physical visitation.

Justification for telepresence in Appendix K shows that the Service recognizes that camera presence "will likely enhance the ability of the Refuge to fulfill the Refuge System mission and the purpose of the Refuge by providing the opportunity for remote wildlife observation to the public. Appendix K also states that the Refuge would remain closed to protect the sensitive wildlife and habitat while the use would increase public awareness of the Refuge and its resources. Changing the focus of objective 3.3 to build a long-term public awareness and stewarsdhip program should be considered as an alternative to on-site access.

Suggested Alternative Objective: Within three years of the CCP's approval, evaluate [and develop] a range of on-site activities for the public [to directly connect with the Refuge] including group media tours, [visitors on boat tours, virtual on-site interactions through interactive telepresence, information "Smart" NOAA buoys for boater use] guided walks, and docent training (including training of docents who present Farallon material through partner organizations such as California Academy of Sciences, boat tour operators or other partners), and implement if safe and compatible.

Suggested Alternative Rationale: Wildlife-dependent recreation is identified in the 1997 Improvement Act as a priority use for refuges when it is compatible with refuge purposes. Because the Refuge is remote and generally cannot be seen from the San Francisco shoreline, its existence and purpose are not well known. The Refuge environment also makes safe access difficult; weather and equipment conditions can vary within a short timeframe, making landings even up until arrival unpredictable. In addition, refuge access requires a substantial amount of infrastructure and personnel to transfer people onto SEFI (the only

island on the Refuge that where access is permitted) from the boat. These and other factors would be [considered when developing] evaluated in the visitor services plan to determine how best to provide [virtual. and alternative on-site opportunities to the public] safe visitor activities that are compatible with the wildlife purpose.

Suggested Alternative Strategies:

- Use existing data on wildlife impacts and resource needs of current human activity on the Refuge to develop compatible public use parameters.
- Evaluate wildlife-dependent recreational activities, [including telepresence, blogs.
   and podcasts.] occurring on other island refuges; collaborate with other stakeholders
   [and education and outreach experts] to research, identify, and analyze appropriate
   opportunities.
- Evaluate the resource and safety needs for implementing-wildlife photography, wildlife observation, interpretation, and environmental education, including opportunities for decent or teacher training opportunities on the Refuge.
- O Assess the opportunity to provide group media tours, implement if feasible.
- o Investigate opportunities for [having telepresence or staff scientist visits through a partnership with] ecotourism operators, such as existing boat tours to provide guided walking tours and evaluate potential impacts.
- o [Evaluate the opportunity to have an interactive telepresence program that includes a live feed of researchers on the Farallon Islands.]
- o [Include objective 3.1 strategies here]

## Chapter 6. Plan Implementation

- Table 9, Budget, Page 98 Although we understand the concept of step-down management
  plans, it is important that the CCP show the macro-level categories for the budget. Right
  now the budget does not show additional funding for almost all of the outreach activities
  listed in the Management Direction section such as building and maintaining the
  infrastructure for a public outreach program.
- Table 11, Monitoring Methods, Page 102 It is likely that an evaluation of public understanding and exposure to the Refuge would be most vast through a telepresence program. We suggest a different monitoring method for the on-site wildlife dependent recreation, by proposing virtual "on-site" wildlife dependent recreation. Changes are suggested as follows:

Record number [Monitor the number of visitors to [partner visitor centers and web-based telepresence sites] the Refuge, providing comment cards [or online surveys] to measure [visitor understanding and exposure] their experience. Monitor wildlife and habitat impacts from visitor use.

## Appendix D. Draft Environmental Assessment (EA)

- General Comments GFNMS has provided most of the evaluation of the alternatives in the first section of this letter. Below are the specific changes we suggest for the EA.
- Alternative B, Public Access and Education, Page D-10 We suggest that the concept of

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64.16

virtual "public access" in the form of telepresence, including interactive telepresence, is included as part of Alternative B, or Alternative C can be changed to include telepresence (including interactive telepresence) as an alternative management measure to allow public access. It appears that the Service has acknowledged this use to promote compatible wildlife observation, which is a form of recreation. Also the compatibility determination notes that access to the island is unpredictable and hazardous; furthermore, access can result in damage to wildlife habitat or introduction of non-native species. By providing the public with an opportunity to view the Refuge, awareness of and appreciation for this remote natural resource will be increased.

- Biological Resources, Page D-33 Change Vegetation to [Terrestrial Vegetation]
- Social and Economic Environment, Page D-39, Recreation It would be helpful to articulate the opportunities and benefits to boaters who recreate near the Farallon Islands for alternative B, C, and D.
- Cumulative Effects, Page D-41, Cumulative Effects on the Physical Environment
  - Climate change could have a profound effect on an island refuge such as the Farallon Islands. [Anticipated effects of climate change on temperate ocean systems include; rising sea level; increased land runoff; higher ocean and land temperatures; changes in wind and wave activity; altered ocean chemistry such as ocean acidification; and changes in ocean circulation.] Sea-level rise, a consequence of climate change, could reduce the total land area of the Refuge; some parts of the islands could become permanently submerged if the estimated sea-level rise of 0.1–0.2 mm/yr should transpire (IPCC 2001). Over time, this could result in significant ramifications for wildlife and vegetation. Habitat for wildlife at the shore could disappear, forcing wildlife to move onto higher ground, possibly competing with other wildlife for habitat. Plant communities at the shore could be inundated or be forced to migrate to higher ground, competing with other vegetation (Smerling et al. 2005). Changing temperatures could also shift vegetation endemic to an area to new locations (Malcolm and Pitelka 2000).
- Cumulative Effects, Page D-41, Cumulative Effects on Biological Resources Move the following sentence to the end of the "Climate Change" paragraph on page D-42 and add the following language:
  - Under Alternative C, the introduction of any on-site public opportunities has the potential of damaging wildlife habitat. This could result in a long-term or cumulative effect to the seabirds and pinnipeds that rely on the Refuge for roosting, breeding and nesting.
- Cumulative Effects, Page D-42, Cumulative Effects on Biological Resources It is important to recognize that cumulative effects has to consider the array of stressors on the area of management. The sections on Threats and Opportunities and Management Concerns cover a laundry list of issues. These issues should be mentioned and considered within the cumulative effects section.

[The wildlife populations of the Farallon Islands currently face the ongoing, human-induced threats of oil spills, introduced species, disturbance, and fishing impacts.] Climate change could also magnify impacts on wildlife habitat, reduce native vegetation, and increase occurrence of nonnative (plant and animal) species on the Refuge. Climate change can result in physiological changes, phenological (lifecycle) changes, range shifts, community changes, ecosystem process shifts, and multiple stressor conditions (Parmesan and Galbraith 2004). Global warming may require organisms to migrate at much higher rates than they have done in the recorded past (Malcolm and Pitelka 2000). [As oceanic variability will potentially increase due to climate change, short-term phenomena that already affect the island's populations including extreme weather events such as heavy storm surge and heat waves (Climate Change Science Program 2008), and changes in upwelling patterns, affecting food availability and the timing of lifecycle events (Bakun 1990: Schwing and Mendelssohn 1997; Mendelssohn and Schwing 2002; Snyder et al. 2003; Barth et al. 2007), can become more pronounced and occur with more frequency.] Native plants could be eliminated from the Refuge by changing temperatures, which could affect the nesting material needs of breeding birds. Moreover, climate change could result in changes in local marine food web dynamics, altering prey resources in the waters adjacent to the Refuge. The potential decrease in food availability near the Refuge could deter seabirds or pinnipeds from migrating to or even breeding on the Farallon Islands and could reduce the ability for wildlife to rear young.

## Appendix F. Special Status Species

• Appendix F, Page F-1 – As mentioned above, the Guadalupe fur seal, Arctocephalus townsendi has been seen on the Farallon Islands. It is federally listed as Threatened and is also protected under the Marine Mammal Protection Act.

## Appendix J. Compatibility Determination for Research

- Existing/Ongoing, Gulf of the Farallones National Marine Sanctuary, Page J-2 to J-3 We suggest changing the description of the dates of the Special Use Permit to reflect the actual windows of time that research is conducted:
  - Visits for up to 4 people to collect point and photo quadrant data are authorized by Special Use Permit (SUP) three times annually (February, August and November) [during late summer (August-September), fall (November-December) and winter (January to mid-March) months].
- Future/Proposed, Page J-3 In order to form a collaborative partnership with the various agencies in NOAA, we suggest adding a sentence of support for supporting research on Threatened and Endangered Species, such as the Steller Sea Lion or Guadalupe fur seal. The following addition is suggested at the end of the second paragraph:
  - [We support research for Threatened and Endangered Species when resulting information from the study(s) outweighs the impacts from the study itself, e.g. disturbance and comanagement agencies, such and National Marine Fisheries Service have permitted the research.]

- Stipulations Necessary to Ensure Compatibility, Page J-5 Throughout the CCP, the breeding season has been noted as beginning March 15. We request that USFWS reconsiders the use of a rigid date when referring to the breeding season. We suggest a more general approach. Recently, the Science Advisory Team of the Marine Life Protection Act Initiative produced a table of sensitive nesting and breeding times for marine mammals and seabirds. Many of the species listed breed on the Farallon Islands. The table showed sensitive breeding times outside of the March 15 to August 15 window. Please see the attached spreadsheet.
- Stipulations Necessary to Ensure Compatibility, Page J-6 We suggest clarifying the type of pinniped assessments by changing the first bullet as follows:

Limit research access to West End to those surveys needed to assess pinniped population levels, pups numbers, [and behavioral data]: six visits between September and October to assess the expanding fur seal colony, and six visits between January and February to monitor elephant seals.

• Stipulations Necessary to Ensure Compatibility, Page J-6 - We suggest adding the following to the tenth bullet:

The Service and PRBO will hold an annual meeting to discuss all issues, including disturbance concerns. [This meeting will include invitations to collaborating Principle Investigators to attend the annual meeting, such as UC Berkeley and GFNMS.] If research or monitoring studies are adversely affecting Refuge resources, the activity will be modified or stopped to avoid impacts.

## Appendix K. Compatibility Determination for Environmental Education

• Description of Use, Page K-1 and K-2 – We have a suggested edit to the description of use section in order to clarify compatible public uses.

64.17

Environmental education, interpretation, wildlife observation, and photography are priority public uses of the National Wildlife Refuge System [when determined compatible if the use is appropriate].

## Appendix M. House Mouse Removal

• Environmental Compliance, Page 40 – The National Marine Sanctuaries Act and subsequent regulations at GFNMS require a discharge permit in addition to an overflight permit. We suggest adding the following information at the end of the NMSA paragraph:

64.18

The waters surrounding the FNWR are within the Gulf of the Farallones National Marine Sanctuary. An overflight permit will be required to fly below 1000' and within one nautical mile of the islands (to prevent disturbing seabirds and pinnipeds). The treatment of the islands will require the helicopter to fly at 50-100', over Sanctuary waters during maneuvers for bait application. [Also, although mitigation will be in place to prevent bait broadcast into the marine environment, there is a potential for discharging into GFNMS waters. Therefore, the FNWR will need to obtain an overflight [and discharge] permit from the Gulf of

Farallones National Marine Sanctuary.

## References (suggested in Appendix A and EA)

GFNMS has suggested that two more studies are cited in the climate change discussion under cumulative effects. The citations are listed as follows:

- Climate Change Science Program (CCSP), 2008: Weather and Climate Extremes in a
  Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific
  Islands. A Report by the U.S. Climate Change Science Program and the Subcommittee on
  Global Change Research. [Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J.
  Hassol, Anne M. Waple, and William L. Murray (eds.)]. Department of Commerce, NOAA's
  National Climatic Data Center, Washington, D.C., USA, 164 pp.
- Bakun, A. (1990) Global climate change and intensification of coastal upwelling. Science 247:198-201.
- Barth, J.A., B.A. Menge, J. Lubchenco, F. Chan, J.M. Bane, A.R. Kirincich, M.A. McManus, K.J. Neilsen, S.D. Pierce, and L. Washburn (2007) Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current. PNAS 104:103719-3724.
- Mendelssohn, R. and F.B. Schwing (2002) Common and uncommon trends in SST and wind stress in the California and Peru-Chile current systems. Progress in Oceanography 53:141-161.
- Schwing, F.B. and R. Mendelssohn (1997) Increased coastal upwelling in the California current. Journal of Geophysical Research 102:3421-3438
- Snyder, M.A., L.C. Sloan, N.S. Diffenbaugh, and J.L. Bell (2003) Future climate change and upwelling in the California Current. Geophysical Research Letters 30:1823-1826.

#### III. CONCLUSION

GFNMS commends the U.S. Fish and Wildlife Service Farallon National Wildlife Refuge in providing an adequate range of alternatives with a clear goal, and specific objectives and looks forward to working with you as an active partner when implementation of the CCP begins. GFNMS appreciates this opportunity to comment on the CCP and EA and can provide additional information as needed for the issuance of the Final CCP and EA. Please contact Karen Reyna at 415-561-6622 x208 if you have any questions. Thank you.

Sincerely,

MARIA BROWN Superintendent

Maria Jarown

Enclosure

# California Marine Life Protection Act Initiative Seasonality of Sensitive Life Stages of Birds and Mammals Most Likely to Benefit from Marine Protected Areas Revised December 10, 2007

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Seabirds (breeding)		Jan	Feb	i ividi		way	<u> </u>	, vu.	1			<u></u>	<u> </u>
cormorant, Brandt's	Phalacrocorax penicillatus												
cormorant, double- crested	Phalacrocorax auritus									CONTRACTOR OF THE CONTRACTOR O			
cormorant, pelagic	Phalacrocorax pelagicus												
guillemot, pigeon	Cepphus columba											sa e e e e e e e e e e e e e e e e e e e	#17 (#18 186X)
murre, common	Uria aalge												
murrelet, marbled	Brachyramphus marmoratus			Year-round in foraging areas									
Seabird (migrant)					~			·			,	F798 by 511 (425 C)	<b>4</b> n. 035201461€
branl	Branta bemidə						CIA COO L COOTT & NOTES	Komilja Hortonia, Mikkin	en transporter and a travel of	W40-37 COURT	h sh he disting wees		
grebe, Western/Clark's	Aechmophorus occidentalis, clarkii												
sandpiper, westem	Calidris mauri												
scaup, lesser	Aythya affinis												
scoter, surf	Melanitta perspicillala								HERSYN AK - KURIA	esterovárnych!	112101011.12101.		
willet	Catoptrophorus semipalmetus												
Marine mammals								r	r		· —		
porpoise, harbor	Phocoena phocena				Year-round								
sea lion, Steller	Eumetopias jubatus				Year-round at haulout sites							<u> </u>	
sea otter, southern	Enhydra lutris				Year-round	Year-round in kelp beds with olters (near Half Moon Bay)							Apple Commence
seal, harbor	Phoca vitulina												

Buffers of 1,000 feet at rookeries, haulouts, and foraging areas are recommended during the times indicated with light grey.

Protection during the times indicated in dark grey would also benefit the species.

Light grey indicate sensitive life stages, primarily breeding/nesting times for resident species and foraging times for migrant species.

Sources: Dr. Sarah Allen, Point Reyes National Seashore and Dr. Gerry McChesney, U.S. Fish & Wildlife Service

- 64.1 Comment acknowledged.
- 64.2 We concur that there are opportunities for partnership.
- 64.3 The visitor services plan was expected to be an open process with partner input. Refer to response at 1.2.
- 64.4 Comment acknowledged. Refer to response at 1.2.
- 64.5 Alternative B focuses on off-site "virtual" experiences through a remote camera system, interpretation at mainland locations, and enhanced charter boat tours. We will also partner with others including your organization to improve outreach.
- 64.6 Off-site environmental education and outreach are emphasized in the final CCP as opposing public access.
- 64.7 Refer to response at 1.2.
- 64.8 We concur.
- 64.9 Comment acknowledged. Alternative B, the proposed action is not expected to conflict with Special Closures developed for SEFI and North Farallon Islands.
- 64.10 Refer to response at 1.2. Human activities have been assessed as they related to other threats such as climate changes and oil spills.
- 64.11 The CCP includes observing climate change impacts to refuge resources as well as monitoring short-term anomalies such as ocean temperature variability and food availability.
- 64.12 The environmental assessment includes an assessment of oil spills and its cumulative effects.
- 64.13 Comments acknowledged.
- 64.14 Revisions made.
- 64.15 Additional infrastructure on-site is not expected for Alternative B. The primary budget needs for outreach activities would be the addition of seasonal environmental education specialist to design off-site outreach and environmental education.
- 64.16 Revisions made.
- 64.17 Environmental education, interpretation, wildlife observation, and photography are priority public uses that have been deemed appropriate and compatible by the National Wildlife Refuge System.
- 64.18 House mouse removal methods, including impacts and mitigation, will be analyzed in a subsequent house mouse eradication plan and environmental analysis.